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Day of the week effect in paper submission/acceptance/rejection to/in/by peer review journals

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HIGHLIGHTS

- Exceptional retrieval of submission dates of scientific papers.
- Exceptional information on acceptance or rejection of scientific papers.
- Unexpected finding about the most probable submission day.
- Unexpected finding about the most often accepted papers if submitted on a given day.
- Relevance of proportionality effects, measure through "entropy distance" arguments.

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ABSTRACT

This paper aims at providing an introduction to the behavior of authors submitting a paper to a scientific journal. Dates of electronic submission of papers to the Journal of the Serbian Chemical Society have been recorded from the 1st January 2013 till the 31st December 2014, thus over 2 years. There is no Monday or Friday effect like in financial markets, but rather a Tuesday–Wednesday effect occurs: papers are more often submitted on Wednesday; however, the relative number of going to be accepted papers is larger if these are submitted on Tuesday. On the other hand, weekend days (Saturday and Sunday) are not the best days to finalize and submit manuscripts. An interpretation based on the type of submitted work ("experimental chemistry") and on the influence of (senior) coauthors is presented. A thermodynamic connection is proposed within an entropy context. A (new) entropic distance is defined in order to measure the "opaqueness" = disorder) of the submission process.

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1. Introduction

Human behavior is controlled by many externalities. Much difficulty for selecting and analyzing them resides in the complexity of establishing experimental schemes, in a laboratory, in view of mimicking the real world. Comparison between laboratory outputs and "common sense expectations" is often impaired by the lack of reliable (and unbiased) data on the latter. For socio-physicists, one basic question about behavior is geared toward finding whether there is some unforced regularity in behavior, *e.g.* weekly, monthly, seasonal or with longer time scales. For example, one finds quantitative considerations on human aspects of synchronized behavior or cyclic rhythms, like menstruation, heart beat or birth rates [1–5]. It is well known that there is a day-of-week effect in financial markets [6–13].

Here, we explore the behavior of agents submitting papers for peer review and publication in a scientific journal. We find that, in the case at hand, more papers are submitted on Tuesday, but relatively (to the total number of submitted papers) more papers are accepted for publications if submitted on Wednesday by the author(s). On the other hand, the highest rejection rate occurs for papers submitted on Saturday. Statistical tests are provided to ensure the validity of the findings. These were hardly predictable, whence it seems worth reporting them, even though they suggest further questions and investigations. While it would be interesting to compare our results with those obtained by studying other journals, such data is not easily available. We admit that it might be often possible through IT infrastructure to retrieve dates of submissions of accepted papers. However, the case of rejected papers is rather hopeless: such "trade secrets" are not shared with external researchers. We have been fortunate to get access to such data in the present case.[3]

Our report is a case study. In order to go beyond our observation, we are aware that more data must be made available by editors and/or publishers. Nevertheless, the outlined findings and subsequent hypotheses, short of a model we also agree on this, on behaviors of scientific authors, take into account their work environment. The results suggest some possibly universal feature for submitted manuscripts in so called "hard core science".

As an introduction to our aim, recall that "agents" can be considered as either rational or irrational, but are also influenced by "external fields", in a socio-physics sense [4], *e.g.* in stock market returns [14] or book or record sales [15], respectively. It is logical to admit that an agent behavior is often influenced by the action of others, but could also be intrinsic due to societal constraints or habit,—and memory experience as well [16]. For example, it has been shown that an investor behavior is different, on Monday and Friday with respect to other days of the week, as noticed in many economist reports [6–13], about stock exchange returns on markets in developed countries. For completeness, let us acknowledge that some debate goes on about such a behavior for stock markets pertaining to "emerging countries" [17,18]. Here, we focus some attention on similar behavioral questions outside the financial and economic sphere, but rather in a scientometrics framework.

The best methodology should consider strict investigation rules on whether a "submission weekday behavior effect" exists and is confirmed, using specific data and pertinent quantitative methods, through questions as:

- can one observe and analyze (scientific) agent (behavior) effects?
- can one find out whether there is any daily difference in behavior?
- can one test whether the findings are reliable?

Thereafter some discussion is expected, together with suggestion for further investigations.

Due to the background of the present researchers, they were able to obtain very reliable data, see Section 2, on the submission of papers to a scientific journal. Moreover, the outcome, acceptance or rejection, was provided. Whence we are able to measure whether some "day of the week" effect exists through statistical tests,—see Section 3, not only on the most popular day for submission, but also on the day for which the outcome will be the most positive (and the most negative) one. Since the various probabilities of interest are empirically known, it is easy to connect the data description with the notion of entropy, thereby measuring and discussing the disorder of author submission of papers, as in Section 4. An interpretation of the findings is proposed in Section 5; a short conclusion is made in Section 6.

2. Data

We have obtained data about how many papers ($N = 596$, in fact) were electronically submitted to The Journal of the Serbian Chemical Society (JSCS)[4] for the years 2013 and 2014. (The journal contains various sub-sections.) JSCS had an impact factor $= 0.912$ in 2012. A histogram of the day of the week submission is shown in Fig. 1.

Next, let us call the numbers of papers later accepted (N_a) and those rejected (N_r); the day-of-the week values are given in Table 1. Among those 596, $N_a = 262$ were finally accepted for publication. At this time of writing, 2 are still under review, and 38 are not yet published. For completeness, let it be recorded that $N_{nrr} = 23$ were rejected because the authors did not reply to the reviewers remarks in due time, while 7 submissions were withdrawn ($N_w = 7$). (Thus, $N_a + N_r \neq N$).

The relative number (expressed in percentages) of papers accepted or rejected after submission (N_a/N and N_r/N) on a specific day of the week is shown in Table 1 and, for having a good visual inspection, in Fig. 2. It appears that, in contrast to the (more often occurring) submission day (Wednesday, day 3),—the next one being Tuesday, the papers are more often

[3] ON and AD are Journal of the Serbian Chemical Society Sub-Editor and Journal of the Serbian Chemical Society Manager, respectively.

[4] http://shd.org.rs/JSCS/.

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