Correlations between submission and acceptance of papers in peer review journals

Marcel Ausloos[1,2] · Olgica Nedič[3] · Aleksandar Dekanski[4]

Abstract

This paper provides a comparative study about seasonal influence on editorial decisions for papers submitted to two peer review journals. We distinguish a specialized one, the Journal of the Serbian Chemical Society (*JSCS*) and an interdisciplinary one, *Entropy*. Dates of electronic submission for about 600 papers to *JSCS* and 2500 to *Entropy* have been recorded over 3 recent years. Time series of either accepted or rejected papers are subsequently analyzed. We take either editors or authors view points into account, thereby considering magnitudes and probabilities. In this sample, it is found that there are distinguishable peaks and dips in the time series, demonstrating preferred months for the submission of papers. It is also found that papers are more likely accepted if they are submitted during a few specific months—these depending on the journal. The probability of having a rejected paper also appears to be seasonally biased. In view of clarifying reports with contradictory findings, we discuss previously proposed conjectures for such effects, like holiday effects and the desk rejection by editors. We conclude that, in this sample, the type of journal, specialized or multidisciplinary, seems to be the drastic criterion for distinguishing the outcomes rates.

Keywords Peer review · Seasonal effects · Paper submission · Paper acceptance · Constraints of editors · Rejection–submission ratios · Peer review management in scientific publishing · Editor work load

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Introduction

In the peer review process, two "strategic" questions have to be considered: on one hand—
for editors, what is the load due to the number (and what is the relative frequency) of
papers submitted at some time during a year?; on the other hand—for authors, is there any
bias in the probability of acceptance of their (by assumption high quality) paper when sub-
mitted in a given month, because of the (being polite) mood of editors and/or reviewers? A
study about such a time concentration (and dispersion) of submitted papers and their subse-
quent acceptance (or rejection) seems to become appropriate from a scientometrics point of
view, in line with recent "effects" found and known through media, like coercive citations
or faked research reports.

In fact, the mentioned question of paper submissions timing is of renewed interest
nowadays in informetrics and bibliometrics due to the flurry of new publication journals
by electronic means. Moreover, paper acceptance rate is of great concern to authors who
feel much bias at some time. No need to say that the peer review process is sometimes
slow, with reasons found in editor's and reviewers' workload, whence a difficulty of find-
ing reviewers. Tying such questions are the open access policy and the submission fees
imposed by publishers. on one hand, but also doubts or constraints about the efficiency in
managing peer-review of scientific manuscriptseditors perspective (Nedič et al. 2018) and
of authors (Drvenica et al. 2019). Thus, one may wonder if there is some "*seasonal*" or
"day of the week" effect.

Very recently, Boja et al. (2018), in this journal, showed that "the *day of the week*
when a paper is submitted to a peer reviewed journal correlates with whether that paper is
accepted", when looking at a huge set of cases for high Impact Factor journals. However,
there was no study of rejected papers.

From the *seasonal* point view, previously, but in recent time, Shalvi et al. (2010) dis-
cussed the case of electronic submission monthly frequency to two psychology journals,
Psychological Science (PS) and Personality and Social Psychology Bulletin (PSPB), over 4
and 3 years respectively. Shalvi et al. (2010) found a discrepancy in the pattern of "submis-
sion-per-month" and "acceptance-per-month" for PS—but not for PSPB. More papers were
submitted to PS during "summer months", but no seasonal bias effect [based on a $\chi^2_{(11)}$ test
for percentages] was found about subsequent acceptance; nevertheless, the percentage of
accepted papers when submitted in Nov. and Dec. was found to be very low. In contrast,
many papers were submitted to PSPB during "winter months", followed by a dip in April,
but the percentage of published papers was found to be greater if the submission to PSPB
occurred in (Aug.–Sept.–Oct.). Moreover, a marked "acceptance success dip" occurred if
the submission was in "winter months". The main difference between such patterns was
conjectured to stem from different rejections policies i.e. employing desk rejections or not.

Later, Schreiber (2012) examined submissions to a specialized journal, Europhysics
Letters (EPL), over 12 years. He observed that the number of submitted manuscripts had
been steadily increasing while the number of accepted manuscripts had grown more slowly.
He claimed to find no statistical effect. However—from Table 2 in Schreiber (2012), there
is a clearly visible maximum for the number of submissions in July, more than 10% over
the yearly mean, and a marked dip in submissions in February—even taking into account
the "month small length". Examining the acceptance rate (roughly ranging between 45 and
55 %, according to the month of submission), he concluded that strong fluctuations can be
seen, between different months,. One detects a maximum in July and a minimum in Janu-
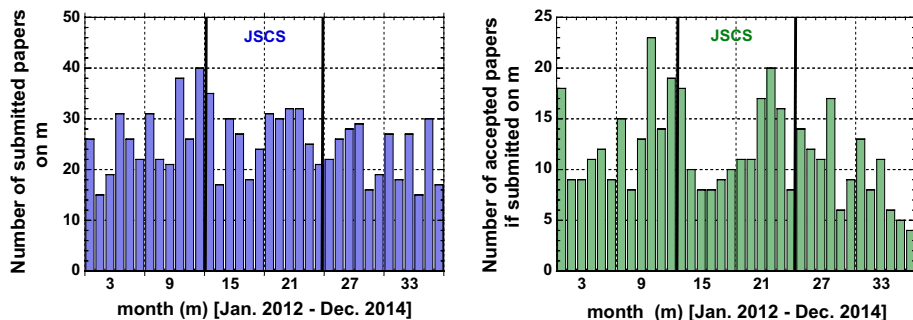ary for the most recent years.

Fig. 1 Time series of (left) the number of submitted papers and (right) of the number of accepted papers when submitted to *JSCS* during a given month (*m*) in 2012, 2013 and 2014

Alikhan et al. (2011) had a similar concern: they compiled submissions, in 2008, to 20 journals pertaining to dermatology. It was found that May was the least popular month, while July was the most popular month. We have estimated a $\chi^2 \simeq 36.27$, from the Fig. 1 data in Alikhan et al. (2011). thereby suggesting a far from uniform distribution. There is no information on acceptance rate in Alikhan et al. (2011).

Other papers have appeared pretending discussing seasonal or so effects, concluding from fluctuations, but finding no effect, from standard deviations arguments—instead of χ^2 tests. Yet, it should be obvious to the reader that a χ^2 test performs better in order to find whether a distribution is uniform or not—our research question. In contrast, a test based on the standard deviation and the confidence interval can only allow some claim on some percentage deviation of (month) outliers; furthermore such studies are tacitly assuming a normality of the (submission or acceptance) fluctuation distributions—which is far from being the case. Usually, the skewness and kurtosis of the distributions to be mandatory complements are not provided in "fluctuations studies" by such authors.

In order to contribute answers to the question on "monthly bias", we have been fortunate to get access to data for submitted, and later either accepted or rejected, papers to a specialized (chemistry) scientific journal and to a multidisciplinary journal. Two coauthors of the present report, ON and AD, are Sub-Editor and Manager of the Journal of the Serbian Chemical Society (*JSCS*). One coauthor MA is a member of the editorial board of *Entropy*. It will be seen that comparing features from these two journals allows one to lift some veil on the reported apparent discrepancy in other cases.

Thus, here below, we explore the fate of papers submitted to these two journals for peer review during a given month, plus their publication fate. We find that, in the case at hands, fluctuations of course occur from one year to another. However, for *JSCS*, submission peaks do occur in July and September, while many less papers are submitted in May and December. A marked dip in submissions occurs in August for *Entropy*—the largest number of submissions occurs in October and December.

However, if the number of submitted papers is relevant for editors and handling machines, the probability of acceptance (and rejection) is much concerning authors. Relatively to the number of submitted papers, it is shown that more papers are accepted for publication if they are submitted in January (and February)—but less so if submitted in December, for *JSCS*; the highest rejection rates occur for papers submitted in December and March. For *Entropy*, the acceptance rate is the lowest in June and December, but is

high for papers submitted during spring months, February to May. Statistical tests, e.g. a χ^2 and confidence intervals, are provided to ensure the validity of the findings.

Due to different desk rejection policies and in order to discuss the effect of such policies as in Alikhan et al. (2011), we discuss a possible specific determinant for *JSCS* data: possible effects due to religious or holiday bias (in Serbia) are commented upon.

Comments on the present study limitations and suggestions for further research (requesting data availability) are found in the conclusion section.

Data

The *JSCS* and *Entropy* peer review process are both mainly managed electronically—whence the editorial work is only weakly tied to the editors working days.[1]

The Journal of the Serbian Chemical Society

JSCS contains 14 sub-sections and many sub-editors, as it can be viewed from the journal website http://shd.org.rs/JSCS/.

The (36 data points) time series of the monthly submissions $N_s^{(m,y)}$ to *JSCS* in a given month ($m = 1, \ldots, 12$) in year (y) (2012, 2013 and 2014) is shown in Fig. 1. The total number of submission ($T_s^{(y)} = \sum_m N_s^{(m,y)}$) decreased by $\sim 17\%$ or so from $y = 2012$ or 2013 to $y = 2014$: 317 or 322 → 274.

Next, let us call the numbers of papers later accepted ($N_a^{(m,y)}$) and those rejected ($N_r^{(m,y)}$). Among the total number of submitted papers ($T_s = \sum_y T_s^{(y)}$) = 913 submitted papers, $T_a = 424 (= 162 + 146 + 116)$ were finally accepted for publication. In view of further discussion, let it be pointed out that among the total number $T_r = 474$ (= 149 + 172 + 153) of (*peer* and subsequently *editor*) rejected papers, i.e. 52%, $T_{dr} = (42 + 81 + 79 =) 202$ papers were *desk rejected*, without going to a peer review process, i.e. 22.1%. For completeness, let it be recorded that several papers were rejected because the authors did not reply to the reviewers remarks in due time and a few submissions were withdrawn (Thus, $T_a + T_r \neq T_s$: 424 + 474 ≠ 913).

The time series of the positive fate, thus acceptance, of submitted papers for a specific month submission is also shown in Fig. 1.

The statistical characteristics[2] of the $N_s^{(m,y)}$, $N_a^{(m,y)}$, $N_r^{(m,y)}$, and $N_{dr}^{(m,y)}$ distributions for *JSCS* are given in Tables 1, 2, 3 and 4.

Entropy

Entropy covers research on all aspects of entropy and information studies. The journal home page is http://www.mdpi.com/journal/entropy.

The (36 data point) time series of the monthly submission to *Entropy* over the years 2014, 2015, and 2016 is shown in Fig. 2. The number of submission increased by $\sim 60\%$

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[1] N.B. Nevertheless, there are days of the week effects (Ausloos et al. 2016).

[2] Thereafter, the indices m and y are not written, for simplicity, if there is no ambiguity.

Table 1 Statistical characteristics of the distribution of the Number $N_s^{(m,y)}$ of papers submitted in a given month to *JSCS* in 2012, 2013, in 2014, $C_s^{(m,y)}$, in 2012, 2013 and 2014 and $N_s^{(m,y)}$ over (2012–2014); notice that $C_s^{(m,y)}$ is obtained after monthly summing. Therefore, the statistical characteristics in the last two columns slightly differ from each other, because the time span is determined as occurring over *N.mo* = 12 or 36 months, respectively

JSCS	$N_s^{(m,y)}$ $y = 2012$	$N_s r^{(m,y)}$ $y = 2013$	$N_s^{(m,y)}$ $y = 2014$	$C_s^{(m,y)}$ $y = (2012 + 2013 + 2014)$	$N_s^{(m,y)}$ $y = [2012 - 2014]$
Maximum	40	35	30	89	40
Sum	317	322	274	913	913
N.mo	12	12	12	12	36
Mean (μ)	26.417	26.833	22.833	76.083	25.361
Median	26	28.50	24	79	26
RMS	27.369	27.413	23.449	76.739	26.143
SD (σ)	7.4767	5.8595	5.5732	10.457	6.4372
Variance	55.902	34.333	31.061	109.36	41.437
SE	2.1583	1.6915	1.6088	3.0188	1.0729
Skewness	0.46015	– 0.4300	– 0.1377	– 0.5794	0.1897
Kurtosis	– 0.6336	– 1.0609	– 1.6261	– 0.9949	– 0.6144
σ / μ	0.2830	0.2184	0.2441	0.1374	0.2538
$\mu - 2\sigma$	11.464	15.114	11.687	55.169	12.757
$\mu + 2\sigma$	41.370	38.552	33.980	96.997	38.235
χ^2	23.278	14.075	14.964	15.811	57.186
$\chi^2_{N.mo-1}(0.95\%)$	4.5748				22.465

Table 2 Statistical characteristics of the distribution of the Number $N_a^{(m,y)}$ of accepted papers if submitted in a given month (m) to *JSCS* in 2012, 2013, in 2014, in 2012, 2013 and 2014 for $C_a^{(m,y)}$, and over (2012–2014); $C_a^{(m,y)}$ is obtained after monthly summing. Therefore, the statistical characteristics in the last two columns slightly differ from each other, because the time span is determined as occurring over $N.mo = 12$ or 36 months, respectively

JSCS	$N_a^{(m,y)}$ y = 2012	$N_a^{(m,y)}$ y = 2013	$N_a^{(m,y)}$ y = 2014	$C_a^{(m,y)}$ y = (2012 + 2013 + 2014)	$N_a^{(m,y)}$ y = [2012 − 2014]
Min	8	8	4	27	4
Max	23	20	17	50	23
Sum	160	146	116	422	422
N.mo	12	12	12	12	36
Mean (μ)	13.333	12.167	9.6667	35.167	11.722
Median	12.50	10.50	10	33	11
RMS	14.071	12.858	10.400	36.023	12.537
SD (σ)	4.6969	4.3450	4.0076	8.1557	4.5078
Variance	22.061	18.879	16.061	66.515	20.321
SE	1.3559	1.2543	1.1569	2.3543	0.7513
Skewness	0.7156	0.6669	0.2111	0.7345	0.5718
Kurtosis	− 0.5251	− 1.1253	− 0.9704	− 0.7319	− 0.3069
σ/μ	0.3523	0.3571	0.4146	0.2319	0.3846
$\mu - 2\sigma$	3.9396	3.4770	1.6520	18.855	2.7065
$\mu + 2\sigma$	22.727	20.857	17.682	51.478	20.738
χ^2	18.200	17.068	18.276	20.806	60.673
$\chi^2_{N.mo-1}$ (0.95%)	4.5748				22.465

Table 3 Statistical characteristics of the distribution of the Number $N_r^{(m,y)}$ of rejected papers if submitted in a given month (m) to *JSCS* in 2012, 2013, and 2014, after monthly summing, for $C_r^{(m,y)}$, and over (2012–2014). Therefore, the statistical characteristics in the last two columns slightly differ from each other, because the time span is determined as occurring over $N.mo = 12$ or 36 months, respectively

JSCS	$N_r^{(m,y)}$ $y = 2012$	$N_r^{(m,y)}$ $y = 2013$	$N_r^{(m,y)}$ $y = 2014$	$C_r^{(m,y)}$ $y = (2012 + 2013 + 2014)$	$N_r^{(m,y)}$ $y = [2012 - 2014]$
Min.	6	7	8	27	6
Max.	21	22	24	49	24
Sum	153	172	153	478	478
N.mo	12	12	12	12	36
Mean (μ)	12.750	14.333	12.750	39.833	13.278
Median	13	13.50	12	40	13
RMS	13.488	15.067	13.432	40.507	14.016
SD (σ)	4.5950	4.8492	4.4133	7.6851	4.5520
Variance	21.114	23.515	19.477	59.061	20.721
SE	1.3264	1.3999	1.2740	2.2185	0.7587
Skewness	0.2206	0.0324	1.3409	− 0.2073	0.4918
Kurtosis	− 0.7684	− 1.2912	1.4934	− 1.3367	− 0.5109
σ/μ	0.3604	0.3383	0.3461	0.1929	0.3401
$\mu - 2\sigma$	3.5601	4.6348	3.9234	24.463	4.1738
$\mu + 2\sigma$	21.940	24.032	21.577	55.204	22.382
χ^2	18.216	18.047	16.804	16.310	54.619
$\chi^2_{N.mo-1}(0.95\%)$	4.5748				22.465

Table 4 Statistical characteristics of the distribution of the Number $N_{dr}^{(m,y)}$ of desk rejected papers if submitted in a given month (m) to JSCS in 2012, 2013, in 2014, in 2012, 2013 and 2014 after monthly summing, for $C_{dr}^{(m,y)}$, and over (2012–2014). Therefore, the statistical characteristics in the last two columns slightly differ from each other, because the time span is determined as occurring over N.mo = 12 or 36 months, respectively

| JSCS	$N_{dr}^{(m,y)}$ $y = 2012$	$N_{dr}^{(m,y)}$ $y = 2013$	$N_{dr}^{(m,y)}$ $y = 2014$	$C_{dr}^{(m,y)}$ $y = (2012 + 2013 + 2014)$	$N_{dr}^{(m,y)}$ $y = [2012 - 2014]$
Min	1	2	4	9	1
Max	8	14	16	21	16
Sum	42	81	79	202	202
N.mo	12	12	12	12	36
Mean (μ)	3.50	6.75	6.5833	16.833	5.6111
Median	3	7	5	18.50	5
RMS	4.1433	7.6431	7.3428	17.378	6.5701
SD (σ)	2.3160	3.7447	3.3967	4.5092	3.4664
Variance	5.3636	14.023	11.538	20.333	12.016
SE	0.6686	1.0810	0.9806	1.3017	0.5777
Skewness	0.5504	0.3994	1.9007	− 0.6008	1.0552
Kurtosis	− 0.8601	− 0.7819	3.0045	− 1.1511	1.1309
σ/μ	0.6617	0.5548	0.5160	0.2679	0.6178
$\mu - 2\sigma$	− 1.1319	− 0.739	− 0.210	7.8148	− 1.3217
$\mu + 2\sigma$	8.1319	14.239	13.377	25.852	12.544
χ^2	16.857	22.852	19.278	13.287	74.951
$\chi^2_{N.mo-1}(0.95\%)$	4.5748				22.465
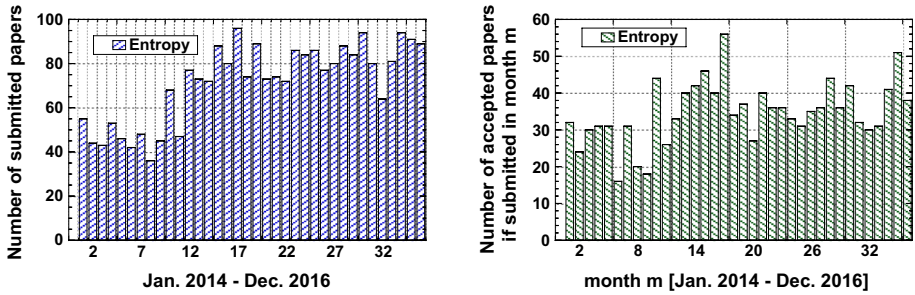
Fig. 2 Time series of (left) the number of submitted papers and (right) of the number of accepted papers when submitted to *Entropy* during a given month in 2014, 2015, and 2016

or so from 2014 to 2015: 604 → 961, but not much (∼ 5%) between 2015 and 2016: 961 → 1008.

Among the $T_s = 2573$ submitted papers, $T_a = 1250$ were finally accepted for publication. The time series of the positive fate, thus acceptance, of submitted papers after a specific month submission, is also shown in Fig. 2.

In view of further discussion below, let it be pointed out that there were $(110 + 162 + 246 =) 518$ peer review rejected papers, i.e. 20.1%; $T_{dr} = (158 + 332 + 315 =)$ 805 papers were desk rejected at submission, i.e. 31.2%.

The statistical characteristics of the $N_s^{(m,y)}$, $N_a^{(m,y)}$, $N_r^{(m,y)}$, and $N_{dr}^{(m,y)}$ distributions for *Entropy* are given in Tables 5, 6, 7 and 8.

Data analysis

The most important value to discuss is the calculated χ^2, for checking whether or not the distribution is uniform over the whole year.

Notice that we can discuss the data not only comparing different years, but also the cumulated data: $C_s^{(m)} = \sum_y N_s^{(m,y)}$, and similarly for $C_a^{(m)}$, $C_r^{(m)}$, and $C_{dr}^{(m)}$, as if all years are "equivalent". For further analysis, we provide the statistical characteristics of the cumulated distributions in Tables 1, 2, 3, 4, 5, 6, 7 and 8.

We have also taken into account that months can have a different number of days, normalizing all months as if there were 31 days long (including the special case of February in 2016). The fact that the number of papers appears not to be an integer, in so doing, is not a drastic point, but more importantly such a data manipulation does not disagree at all with our following conclusions. Thus, we do not report results due to such "data normalization".

JSCS data analysis

In all *JSCS* cases, the mean of each distribution decreases from 2013 to 2014; so does the standard deviation σ. This is the case for the cumulated time series, $C^{(m)} = N^{(m,2012)} + N^{(m,2013)} + N^{(m,2014)}$, data which necessarily differs from $N^{(m,[2012-2014])}$. The coefficient of variation (CV ≡ σ/μ) is always quite small, indicating that the data is

Table 5 Statistical characteristics of the distribution of the Number $N_s^{(m,y)}$ of papers submitted in a given month (m) to *Entropy* in year ($y =$) 2014, 2015, and 2016, after monthly summing for $C_s^{(m,y)}$, and over (2014–2016). Therefore, the statistical characteristics in the last two columns slightly differ from each other, because the time span is determined as occurring over $N.mo = 12$ or 36 months, respectively

Entropy	$N_r^{(m,y)}$ $y = 2014$	$N_r^{(m,y)}$ $y = 2015$	$N_r^{(m,y)}$ $y = 2016$	$C_r^{(m,y)}$ $y = (2014 + 2015 + 2016)$	$N_r^{(m,y)}$ $y = [2014 – 2016]$
Min.	36	72	64	173	36
Max.	77	96	94	250	96
Total	604	961	1008	2573	2573
N.mo	12	12	12	12	36
Mean (μ)	50.33	80.08	84.00	214.42	71.47
Median	46.5	77.0	85.0	215.5	75.5
RMS	51.548	80.473	84.388	215.26	73.608
SD (σ)	11.618	8.2623	8.4423	19.861	17.853
Variance	134.97	68.265	71.273	394.45	318.71
Std Err.	3.3537	2.3851	2.4371	5.7333	2.9754
Skewn.	1.2197	0.5534	− 0.9402	− 0.3477	− 0.5598
Kurt.	0.5738	− 1.0378	0.6370	0.1712	− 1.0162
σ/μ	0.2308	0.1032	0.1005	0.0926	0.2498
$\mu - 2\sigma$	27.098	63.559	67.115	174.70	35.767
$\mu + 2\sigma$	73.569	96.608	100.88	254.14	107.18
χ^2	29.4969	9.3767	9.3333	20.2356	156.075
$\chi^2_{N.mo-1}(0.95\%)$	4.5748				22.465

Table 6 Statistical characteristics of the distribution of the Number $N_a^{(m,y)}$ of accepted papers if submitted in a given month to *Entropy* in 2014, in 2015, and in 2016, after monthly summing for $C_a^{(m,y)}$, and over (2014–2016). Therefore, the statistical characteristics in the last two columns slightly differ from each other, because the time span is determined as occurring over $N.m = 12$ or 36 months, respectively

Entropy	$N_r^{(m,y)}$ $y = 2014$	$N_r^{(m,y)}$ $y = 2015$	$N_r^{(m,y)}$ $y = 2016$	$C_r^{(m,y)}$ $y = (2014 + 2015 + 2016)$	$N_r^{(m,y)}$ $y = [2014 – 2016]$
Minimum	16	27	30	77	16
Maximum	44	56	51	123	56
Total	336	467	447	1250	1250
$N.mo$	12	12	12	12	36
Mean (μ)	28.00	38.92	37.25	104.17	34.72
Median	30.5	38.5	36.0	103.5	34.5
RMS	28.960	39.530	37.737	104.98	35.709
SD (σ)	7.7225	7.2420	6.3120	13.617	8.4536
Variance	59.636	52.447	39.841	185.42	71.463
Std Err	2.2293	2.0906	1.8221	3.9309	1.4089
Skewn.	0.21896	0.82477	0.76955	− 0.43449	0.05694
Kurt.	− 0.16185	0.96295	− 0.18015	− 0.54925	0.38648
σ / μ	0.2758	0.1861	0.1694	0.1307	0.2435
$\mu − 2\sigma$	12.555	24.433	24.626	76.933	17.815
$\mu + 2\sigma$	43.445	53.401	49.874	131.40	51.629
χ^2	23.4286	14.8243	11.7651	19.5802	72.0357
$\chi^2_{N.mo-1} (0.95\%)$	4.5748				22.465

Table 7 Statistical characteristics of the distribution of the Number $N_r^{(m,y)}$ of rejected papers if submitted in a given month to *Entropy* in 2014, in 2015, and in 2016, after monthly summing for $C_r^{(m,y)}$, and over (2014–2016). Therefore, the statistical characteristics in the last two columns slightly differ from each other, because the time span is determined as occurring over $N.mo = 12$ or 36 months, respectively

Entropy	$N_r^{(m,y)}$ $y = 2014$	$N_r^{(m,y)}$ $y = 2015$	$N_r^{(m,y)}$ $y = 2016$	$C_r^{(m,y)}$ $y = (2014 + 2015 + 2016)$	$N_r^{(m,y)}$ $y = [2014 - 2016]$
Min.	3	8	13	32	3
Max.	14	21	32	58	32
Total	110	162	246	518	518
N.mo	12	12	12	12	36
Mean (μ)	9.1667	13.500	20.500	43.167	14.389
Median	9.5	12.0	19.5	43.0	13.0
RMS	9.8826	14.160	21.264	43.648	15.815
SD (σ)	3.8573	4.4620	5.9007	6.7532	6.6559
Variance	14.879	19.909	34.818	45.606	44.302
Std Err	1.1135	1.2881	1.7034	1.9495	1.1093
Skewn.	− 0.3109	0.5387	0.3993	0.5855	0.5970
Kurt.	− 1.3129	− 1.1113	− 0.6683	0.2828	0.0303
σ / μ	0.4208	0.3305	0.2878	0.1564	0.4626
$\mu - 2\sigma$	1.4521	4.5761	8.6986	29.660	1.0770
$\mu + 2\sigma$	16.881	22.424	32.301	56.673	27.701
χ^2	17.8545	16.2222	18.6829	11.6215	107.7598
$\chi^2_{N.mo-1}(0.95\%)$	4.5748				22.465

Table 8 Statistical characteristics of the distribution of the Number $N_{dr}^{(m,y)}$ of desk rejected papers if submitted in a given month (m) to *Entropy* in 2014, in 2015, and in 2016, after monthly summing for $C_{dr}^{(m,y)}$, and over (2014–2016). Therefore, the statistical characteristics in the last two columns slightly differ from each other, because the time span is determined as occurring over $N.mo = 12$ or 36 months, respectively

Entropy	$N_{dr}^{(m,y)}$ $y = 2014$	$N_{dr}^{(m,y)}$ $y = 2015$	$N_{dr}^{(m,y)}$ $y = 2016$	$C_{dr}^{(m,y)}$ $y = (2014 + 2015 + 2016)$	$N_{dr}^{(m,y)}$ $y = [2014 - 2016]$
Min.	9	11	15	49	9
Max.	30	39	41	88	41
Total	158	332	315	805	805
N.mo	12	12	12	12	36
Mean (μ)	13.167	27.667	26.250	67.083	22.361
Median	11.0	28.5	25.0	69.0	24.0
RMS	14.329	28.601	27.017	67.894	24.175
SD (σ)	5.9058	7.5719	6.6759	10.925	9.3171
Variance	34.879	57.333	44.568	119.36	86.809
Std Err	1.7049	2.1858	1.9272	3.1538	1.5529
Skewness	2.1223	− 0.5584	0.4944	0.0229	0.0697
Kurtosis	3.6775	0.2982	0.3776	− 0.5016	− 1.0381
σ/μ	0.4485	0.2737	0.2543	0.1629	0.4167
$\mu - 2\sigma$	1.3550	12.523	12.898	45.233	3.7269
$\mu + 2\sigma$	24.978	42.810	39.602	88.933	40.995
χ^2	21.5197	10.0404	8.2881	6.5221	15.5365
$\chi^2_{N.mo-1}(0.95\%)$	4.5748				22.465

reliable beyond statistical sampling errors. For either C_s or C_a, the coefficient of variation[3] for the cumulated data is lower than the other CVs, a posteriori pointing to the (statistical) interest of accumulating data for each month of different years—beside looking at the more dispersed data over a long time span.

Next, observe the summary of statistical characteristics in Tables 1, 2, 3 and 4; they show that the distributions are positively skewed, except those for the submitted papers which are negatively skewed. The kurtosis of each distribution is usually negative, except for the anomalous cases, $N_r^{(m,2014)}$ and $N_{dr}^{(m,2014)}$. It can be concluded that the distributions are quite asymmetric, far from a Gaussian, but rather peaked.

Almost all measured values fall within the classical confidence interval $]\mu - 2\sigma, \mu + 2\sigma[$. However, in five cases, a few extreme values fall above the upper limit, as can be deduced from the Tables.

"Finally", notice that all χ^2 values, reported in Tables 1, 2, 3 and 4 are much larger than the 95% critical value: they markedly allow to reject the null hypothesis, i.e. a uniform distribution, for each examined case. Thus a monthly effect exists beyond statistical errors for all N_s, N_a, N_r and N_{dr} cases.

Entropy data analysis

In the case of *Entropy* data, the CV is usually low—and much lower than in the case of *JSCS*. The skewness and kurtosis are not systematically positive or negative. The number of outliers outside the confidence interval is also "not negligible"; this is hinted from the number of maximum and minimum values falling outside the confidence interval, yet "not too far" from the relevant interval border. Nevertheless, this implies that the distribution behaviors are influenced by the number of data points, to a larger extent for *Entropy* than for *JSCS*.

Nevertheless, notice that all χ^2 values, reported in Tables 5, 6, 7 and 8 are also much larger than the 95% critical value: they markedly allow to reject the null hypothesis, i.e. a uniform distribution, for each examined case. A month anomaly effect exists beyond statistical errors for all N_s and N_a; it is weaker for the N_r and N_{dr} cases. The large χ^2 values obviously point to distinguishable peaks and dips, thereby markedly promoting the view of monthly effect bias for N_s and N_a.

Discussion

Let us first recall that the journals here examined have different aims; one is a specialized journal, the other is an interdisciplinary journal. To our knowledge, this is the first time that a journal with such a "broadness" is considered within the question on monthly bias. It seems that one should expect an averaging effect due to a varied number of constraints on the research schedules pertaining to different topics and data sources. One subquestion pertains on whether a focussed research influences the timing of paper submission, and later acceptance (or rejection). One would expect more bias for the *JSCS* case than for

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[3] The coefficient of variation is usually used to compare distributions; even if the means are drastically different from one another; its value also points toward a possible anomalous spread of the distribution or a multipeak effect.

the *Entropy* case. Comparing journals (in psychology), but with different "specializations", Shalvi et al. (2010) had found different behaviors indeed. Let us observe what anomalies are found in the present cases.

JSCS

Comparing months in 2012, 2013 and 2014, it can be noticed that the most similar months (the least change of positions in the decreasing order of "importance") are Dec., May, June for the lowest submission rate, while Sept. and July are those remaining on the top of the month list, for the highest submission rate; see figures. A specific deduction seems to be implied: there is a steady academic production of papers strictly before and after holidays, but there is a quiet (production and) submission of papers before holidays. This finding of July production relevance is rather similar to that found for most other journals—except PSPB (Shalvi et al. 2010).

Concerning the May dip anomaly, one may remind ourselves that in most countries (including Serbia), lectures and practical work at faculties end by June; since many authors (professors, assistants) are very engaged with students at that time, probably May is not the month when they are focused on writing papers but rather "prefer" finishing regular duties. In fact, corroborating this remark, it has been observed that most papers submitted to *JSCS* are from academia researchers (Nedič and Dekanski 2015).

A huge peak in January 2013 is intriguing. It was searched whether something special occurred *ca*. January 2013; it was checked that the submission system worked properly: there was no special clogging a month before. Moreover, there were no special invitations or collection of articles for a special issue. Therefore, the peak can be correlated to that found for PS. From such a concordance, it seems that more quantitative correlation aspects could be searched for through available data.

Notice that on a month rank basis, for 2013 and 2014, the Kendall τ coefficient $\simeq -0.0303$ for submitted papers, but $\simeq -0.3030$ for accepted papers; concerning the correlation between the cumulated N_s and N_a, the Kendall τ coefficient $\simeq -0.2121$.

Two other points related to *JSCS*, are discussed in "Seasonal desk rejection by editor" and "Optimal submission month, -for paper later acceptance" sections: (1) the possible influence of desk rejection policy, a conjecture of Shalvi et al. (2010), for distinguishing patterns, and (2) the acceptance and rejections rates, which are tied to the submission patterns, but also pertain to the "entrance barrier" (editor load mood) conjecture proposed by Schreiber (2012).

Entropy

In the case of *Entropy*, the cumulated measure (over the 3 years here examined) points to a more frequent submission in December, and a big dip in August. From a more general view point, there are more papers submitted during the last 3 months of the year. A marked contrast occurs for the accepted papers for which a wide dip exists for 4 months : from June till September. The discussion on desk rejection and better chance for acceptance are also found in "Seasonal desk rejection by editor" and "Optimal submission month, -for paper later acceptance" sections.

Notice that for the correlation between the cumulated N_s and N_a, the Kendall τ coefficient $\simeq 0.4242$.

Finally, comparing the cumulated numbers of submitted and accepted papers to *JSCS* and to *Entropy*, and ranking the months accordingly, the Kendall τ coefficient is weakly negative: $\simeq -0.333$ and -0.1818, respectively.

Constraint determinants

Seasonal desk rejection by editor

Often controversial or scorned upon, the desk rejection patterns can be discussed now. Tables 4, 8 provide the relevant data respectively for *JSCS* and *Entropy*. Notice that for either *JSCS* or *Entropy*, we do not discuss reasons why editors (and reviewers) reject papers; these reasons are outside the present considerations; see for some information (Callaham et al. 1998; Cole et al. 1981; Hargens 1968).

Let us consider *JSCS* first. It can be observed that "only" (160/596) $\simeq 27\%$ papers are desk rejected—this is interestingly compared to the ("*many*") rejected papers after peer review: 325/596 $\simeq 0.55$, for *JSCS*; the ratio is $\sim 1/2$. The highest desk rejection rate occurs for papers submitted in Nov., while the lowest is for those submitted in May; see Fig. 3. Distinguishing years, it happens that a high rejection rate occurs if the papers were submitted in Nov. 2014 and Aug. 2013, while a low rejection rate occurred for papers submitted in Feruary and May 2013.

There is no apparent month correlations. For example, the month with the greatest number of submissions (overall) is Sept.; the rejection rate in Sept. 2013 was 0.469, out of which 0.250 were desktop rejected. In Sept. 2014, these percentages were 0.555 and 0.333. On the other hand, the month with the lowest number of submissions is May. In May 2013, the rejection rate was 0.500, but desktop rejection was only 0.111. In May 2014, the rejection rate was 0.562, and desktop rejection was 0.250.

For completeness in arguing, let it be known that official holidays in Serbia are on Jan. 1–2 and 7 (Christmas day), Feb. 15–16, in April (usually) one Friday and one Monday (Easter holiday), May 1–2, and Nov. 11—at which time one does not expect editors to be on duty for desk rejection.

Next concerning *Entropy*, (805/2573) $\simeq 31\%$ are desk rejected at submission, much more than those rejected by reviewers (and the editor), i.e. (518/2573) $\simeq 20\%$. The greatest desk rejection occurs in December and January—the lowest in February, May, and August. However, in terms of percentage of desk rejection with respect to the number of submitted papers, the months of December, September and June are the most probable, while in February and May the editors seem more soft.

Conclusions: there seems to be no effect due to holidays on the editorial workflow, as months most often containing holidays (January, July and August) exhibit no special statistical anomaly—with respect to either submission or decision rate as compared to other months, for *JSCS*. Yet, the χ^2 is quite large (~ 16.55; see Table 4). Thus, the seasonal effect might have another origin. The *Entropy* N_{dr} data distribution is even more uniform ($\chi^2 \sim 6.52$; see Table 8). If any, some seasonal effect on N_{dr} might occur during winter time.

Entrance barrier editor load effect

Schreiber (2012) considers that an entrance barrier can be set up by editors due to their work load. We understand such a bias as resulting from an accumulation of submitted
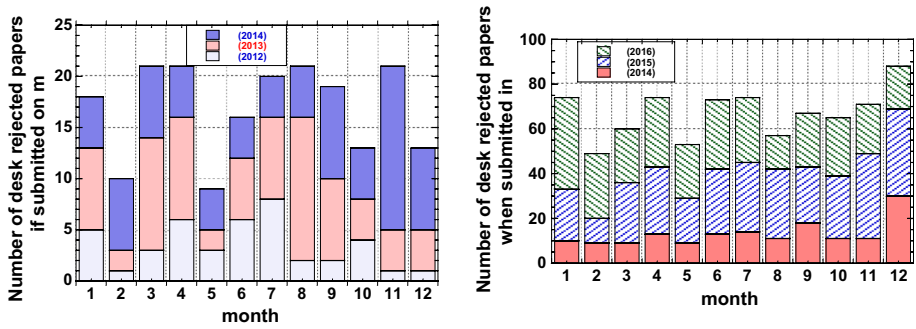
Fig. 3 Aggregated distribution of the number of desk rejected papers when submitted (left) to *JSCS* during a given month, in 2012 or in 2013 or in 2014 and (right) to *Entropy* during a given month in 2014 or in 2015, or in 2016

papers at some time thereafter correlated to a large rate of desk rejection. One can without much restriction assume that the correlation has to be observed for zero month-time lag, since both journals are usually prone to replying quickly to authors.

A visual comparison of the correlation between the number of desk rejected papers and the number of submitted papers to *JSCS* during a given month, distinguishing 2012 and 2013 from 2014 or to *Entropy* during a given month in 2014 or in 2015, or in 2016 is shown in Fig. 4. For *JSCS*, the number of desk rejected papers is roughly proportional to the number N_s during a given month, $\simeq 25\%$, a value already noticed—except at $N_s \sim 30$, when N_{dr} can be as large as 30–50%. However, both in 2013 fall and 2014 spring–summer time, there are months for which N_s is large, but N_{dr} is low, leading to a doubt on a editor barrier load effect.

For *Entropy*, it occurs that there are two clusters separated by borders $N_s \sim 70$ and $N_{dr} \sim 20$. When $N_s \geq 70$, the number of desk rejected papers proportionally much increases. That was surely the case in 2015.

Conclusions: *JSCS* or *Entropy* editors may raise some entrance barrier due to overload whatever the season,

Optimal submission month, -for paper later acceptance

The above data and discussion on the number of papers is relevant for editors, and automatic handling of papers. Of course, this holds partially true as well for authors who do not want to overload editorial desks with many publications at a given time, since authors expect some rather quick (and positive) decision on their submission. However, another point is of great interest for authors, somewhat bearing on the reviewer and desk editor mood. The most relevant question, on a possible seasonal bias, for authors is whether his/her paper has a greater chance to be accepted if submitted during a given month. Thus, the probability of acceptance, the so called "acceptance rate" is a relevant variable to be studied!

The relative number (i.e. monthly percentages) of papers accepted or rejected, $p_{a,s}^{(m,y)} = N_a^{(m,y)}/N_s^{(m,y)}$ or $p_{r,s}^{(m,y)} = N_r^{(m,y)}/N_s^{(m,y)}$, after submission on a specific month is easily obtained from the figures. The months (*mo*) can be ranked, e.g. in decreasing order of importance, according to such a relative probability (thereafter called p_a)
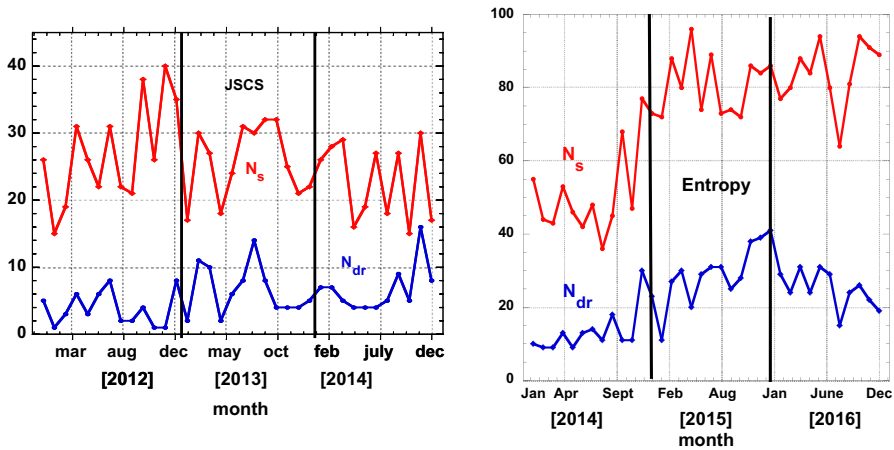
Fig. 4 Entrance barrier load conjecture effect. Visual correlation between the number of desk rejected papers and the number of submitted papers to (left) *JSCS* during a given month, between 2012 and 2014 or to (right) *Entropy* during a given month between 2014 and 2016

of having a paper accepted if submitted in a given month (*m*) to *JSCS* or to *Entropy* in given years; see Table 9. One can easily obtained the corresponding p_r of rejected papers; see Table 10. This holds true for any yearly time series leading to some $p_a \equiv p_{a,s}^{(m,y)} = N_a^{(m,y)}/N_s^{(m,y)}$, whence allowing to compare journals according to

$$
p_a - p_r = \sum_y [p_{a,s}^{(m,y)} - p_{r,s}^{(m,y)}] \equiv \sum_y \left[\frac{N_a^{(m,y)}}{N_s^{(m,y)}} - \frac{N_r^{(m,y)}}{N_s^{(m,y)}} \right]. \tag{6.1}
$$

Table 9 Months (*mo*) ranked in decreasing order of importance according to the probability $p_a = N_a^{(m)}/N_s^{(m)}$ of having a paper accepted if submitted in a given month (*m*) to *JSCS* or to *Entropy* in given years

JSCS						Entropy					
2012		2013		2014		2014		2015		2016	
p_a	mo	p_a	mo	p_a	mo	p_a	mo	p_a	mo	p_a	mo
0.6923	Jan	0.6400	Nov	0.6364	Jan	0.6977	Mar	0.5833	Feb	0.5604	Nov
0.6191	Sep	0.6250	Oct	0.5862	Apr	0.6739	May	0.5833	May	0.5000	Apr
0.6053	Oct	0.5882	Feb	0.4815	July	0.6471	Oct	0.5479	Jan	0.4687	Aug
0.6000	Feb	0.5312	Sept	0.4737	June	0.6458	July	0.5405	Sept	0.4545	Feb
0.5909	Aug	0.5143	Jan	0.4615	Feb	0.5849	Apr	0.5227	Mar	0.4500	Mar
0.5385	Nov	0.5000	May	0.4444	Aug	0.5818	Jan	0.5000	Oct	0.4468	June
0.4839	July	0.4167	June	0.4074	Sept	0.5556	Aug	0.5000	Apr	0.4362	Oct
0.4750	Dec	0.3810	Dec	0.4000	Oct	0.5532	Nov	0.4595	June	0.4286	May
0.4615	May	0.3667	Aug	0.3929	Mar	0.5455	Feb	0.4186	Nov	0.4270	Dec
0.4091	June	0.3548	July	0.3750	May	0.4286	Dec	0.4157	July	0.4000	July
0.3548	Apr	0.2963	Apr	0.2353	Dec	0.4000	Sept	0.3929	Dec	0.3827	Sept
0.3158	Mar	0.2667	Mar	0.1667	Nov	0.3810	June	0.3699	Aug	0.3605	Jan

Table 10 Months (*mo*) ranked in decreasing order of importance according to the probability $p_r = N_r^{(m)}/N_s^{(m)}$ of having a paper rejected if submitted in a given month (*m*) to *JSCS* or to *Entropy* in given years

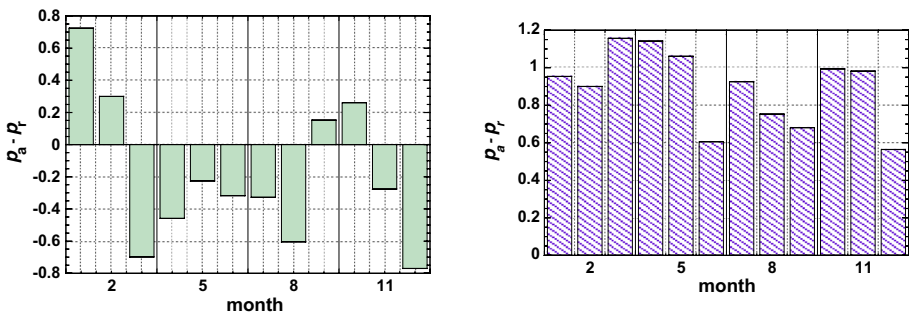| JSCS						Entropy					
2012		2013		2014		2014		2015		2016	
p_r	mo	p_r	mo	p_r	mo	p_r	mo	p_r	mo	p_r	mo
0.6129	Apr.	0.7333	Mar.	0.8000	Nov	0.3095	June	0.2639	Feb.	0.3596	Dec.
0.5909	June	0.7037	Apr.	0.7647	Dec.	0.2500	Feb.	0.2360	July	0.3210	Sept.
0.5263	Mar.	0.6333	Aug.	0.6000	Oct.	0.2364	Jan.	0.2083	May	0.2969	Aug.
0.5250	Dec.	0.6129	July	0.5714	Mar.	0.2128	Nov	0.2055	Aug.	0.2872	Oct.
0.5161	July	0.5714	Dec.	0.5625	May	0.2000	Sept.	0.1705	Mar	0.2857	May
0.5000	May	0.5000	June	0.5556	Aug.	0.1912	Oct.	0.1486	June	0.2500	Mar.
0.4615	Nov	0.5000	May	0.5556	Sept.	0.1818	Dec.	0.1429	Dec.	0.2375	July
0.4000	Feb.	0.4857	Jan.	0.5385	Feb.	0.1698	Apr.	0.1395	Nov	0.2234	June
0.3947	Oct.	0.4687	Sept.	0.5263	June	0.1389	Aug.	0.1370	Jan.	0.1978	Nov
0.3809	Sept.	0.4118	Feb.	0.5185	July	0.1304	May	0.1250	Apr.	0.1688	Feb.
0.3636	Aug.	0.3750	Oct.	0.3793	Apr.	0.0930	Mar.	0.1216	Sept.	0.1628	Jan.
0.3077	Jan.	0.3600	Nov	0.3636	Jan.	0.0625	July	0.1111	Oct.	0.1477	Apr.

Fig. 5 Monthly aggregated percentages difference between accepted (p_a) and rejected (p_r) number of papers, normalized to the number of submitted papers, on a given month (left) to *JSCS* over (2012–2014), (right) to *Entropy* in (2014–2016)

One could also consider

$$q_a - q_r = \left[\frac{\sum_y N_a^{(m,y)}}{\sum_y N_s^{(m,y)}} - \frac{\sum_y N_r^{(m,y)}}{\sum_y N_s^{(m,y)}} \right] \equiv \left[\frac{C_a^{(m)}}{C_s^{(m)}} - \frac{C_r^{(m)}}{C_s^{(m)}} \right] \quad (6.2)$$

for the corresponding cumulated data over each specific time interval. A comment on the matter is postponed to the "Appendix".

JSCS case

The relevant percentage differences between accepted and rejected number of papers to *JSCS* in 2013 and 2014 are given in Fig. 5.

From this difference in probability perspective, it does not seem to be recommended that authors submit their paper to *JSCS* in Mar or Dec. They should rather submit their papers in January, with some non-negligible statistical chance of acceptance for submissions in February or October.

Entropy case

For *Entropy*, an equivalent calculation of $p_a - p_r$ can be made—from aggregating data in Fig. 2, over a 12 month interval leading to Fig. 5. Even though the best percentage of accepted papers occurs if the papers are submitted from January till May (with a steady increase, in fact) and in October and November, the percentage of submitted papers in December is the largest of the year, and the probability of acceptance is the lowest for such papers.

Thus, a marked dip in acceptance probability occurs if the papers are submitted during the summer months (June–Sept.), as seen in Fig. 5, whence suggesting to avoid such months for submission to *Entropy*.

Warnings and discussion

For fully testing seasonal effects, one might argue that one should correlate the acceptance/rejection matter to the hemisphere, or/and to nationality of authors, and notice the influence of co-authors.[4]

We apologize for not having searched for the affiliations (either in the southern or northern hemisphere—since seasons are different) of submitting authors to *Entropy*; we expect that such a "hemisphere effect", if it exists, is hidden in the statistical error bar of the sample, $\simeq 1/\sqrt{N_s} \sim 4\%$. Concerning the nationalities of authors (and reviewers) of *JSCS* in the period Nov. 2009–Oct. 2014, those have been discussed by Nedič and Dekanski (2015); see Figs. 3, 2 respectively in Nedič and Dekanski (2015). For completeness, let us mention that the distribution of data on papers submitted, accepted, rejected, withdrawn, to JSCS from mainly Serbian authors and from "outside Serbia, on given years can be found in Table 11. From such a reading, it appears that JSCS editors are fair, not biased, in favor or against papers with the corresponding author being from Serbia.

At this level, more importantly, a comparison resulting form the observation of Fig. 5 allows to point to a marked difference between a specialized journal and a multidisciplinary one—at least from the editorial aim, and the peer reviewers points of view. The difference between the probability of acceptance and that of rejection, on a monthly basis, i.e. $p_a - p_r$, has an astoundingly different behavior: the $p_a - p_r$ value is only positive over 3 months for *JSCS*, but is always positive for *Entropy*. This can be interpreted in terms of peer review control. Recall that the percentage of desk rejection is approximatively the same for *JSCS* and *Entropy*, but the peer review rejection is much higher ($\sim 55\%$) for *JSCS* in contrast with a $\sim 20\%$ reviewer rejection rate for *Entropy*. In terms of seasonal effect, one has a positive value in January (and February) for *JSCS*, but a positive effect for the spring and fall months for *Entropy*. We consider that such a spread is likely due to the

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[4] Those of editors might also be of concern: most are Serbians for *JSCS*, the variety is large for *Entropy*.

Table 11 Data on papers submitted, accepted, rejected, withdrawn, to JSCS from mainly Serbian authors and from authors "outside Serbia", on given years

JSCS	Papers	Total	From Serbia	From "outside"
2012	Submitted	317	84	233
	Accepted	160	70	90
	Rejected	153	14	139
	Withdrawn	4	1	3
2013	Submitted	322	92	231
	Accepted	146	65	81
	Rejected	172	25	147
	Withdrawn	4	2	2
2014	Submitted	293	83	210
	Accepted	130	62	68
	Rejected	160	20	140
	Withdrawn	3	1	2

multidisciplinary nature of the latter journal, reducing the strong monthly and seasonal bias on the fate of a paper.

Conclusion

Two remarks seem to be of interest for attempting some understanding of these different findings. On one hand, statistical procedures (either χ^2 or confidence interval bounds $\mu \pm 2\sigma$) have not to lead to identical conclusions: both can point to deviations, but the former indicates the presence (or absence) of peaks and dips with respect to the uniform distribution, while the latter points to statistical deviations when the distributions of residuals is expected to be like a Gaussian. In the latter case, an extension of the discussion including skewness and kurtosis is mandatory (Doane and Seward 2011). We have pointed out such departures from Gaussianity. The second remark on monthly and/or seasonal bias, in view of the contradistinctions hereby found between the chemistry and multidisciplinary journal, might not be mainly due to desk rejection effects, as proposed by Shalvi et al. (2010), but rather pertains to the peer reviewers having different statuses within the journal aims spread.

In so doing, by considering two somewhat "modest, but reliable" journals,[5] we have demonstrated seasonal effects, in paper submission and also in subsequent acceptance. A seasonal bias effect is stronger in the specialized journal. Recall that one can usually read when an accepted paper has been submitted, but the missing set, the rejected papers when submitted, is usually unknown. Due to our editorial status, we have provided a statistical analysis about such an information. Our outlined findings and intrinsic behavioral hypotheses markedly take into account the scientific work environment, and point, in the present

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[5] The value T_a/T_s is often reported by publishers and editors as a "quality criterion" for a given journal. It is easy to find from the above data that $T_a/T_s \simeq 0.44$ and 0.49 for *JSCS* and *Entropy* respectively; *JSCS* had an impact factor (IF) = 0.970 in 2015, which is the result of articles published in (2013–2014); its 5-year IF is 0.997, and h(2017) = 33; *Entropy* had an IF = 1.821 (2016) and a 5-year IF = 1.947 (2016), while h(2017) = 37.

cases, to seasonal bias effects, mainly due to authors in the submission/acceptance stage of the peer review process.

Let us develop one point on the study limitation here: all authors of this manuscript have spent a lot of time trying to involve other journals in this investigation. Allow us not to list the journals nor editors. There were, however, very serious obstacles to our intention. A fair number of journal editors expressed the wish to cooperate and share their data. When they asked their publishers for permission to open the data, the permission was not given. Additionally, as collaborators in the same COST action TD 1306 (New Frontiers of Peer-Review), we had the opportunity to directly discuss this issue with representatives of many (the main) scientific journal publishers but data on their journals remained closed. Publishers themselves perform certain investigations and it seems that they rarely share their data with outsiders, whence we were forced to limit ourselves to journals not published by well-known publishers. During our literature search, we have seen that there are papers dealing with specific aspects of publishing in just one journal or 2–3 journals confirming that there are objective difficulties to collect information on a greater number of journals.

We, however, hope that even separate data on specific journals, if publicly reported, will, finally, lead to a cumulative collection of information which, after being published, will enable a fairer comparison between journals and disciplines than presently. This will contribute to overcome limitations of each individual study, and will generate more general knowledge on this subject.

Thus, in order to go beyond our observation, we are aware that more data must be made available by editors and/or publishers. Avoiding debatable hypotheses on the quality of papers, ranking of journals, fame of editors, open access publicity, submission fees, publication charges, and so on, we may suggest more work on time lag effects, beyond (Mrowinski et al. 2016, 2017), in order to pin point better the role of both editors and reviewers quality and concern. In so doing, it might be wise to consider some ARCH-like modeling of seasonal effects, as it has been done for observing day of the week effect in paper submission/acceptance/rejection to/in/by peer review journals as in Ausloos et al. (2017). This suggestion of ARCH econometric-like modeling is supplementary supported by arguments as in related bibliometric studies. Indeed, one could develop a Black–Scholes–Schrödinger–Zipf–Mandelbrot model framework for studying seasonal effects—instead of the coauthor core score as in Rotundo (2014).
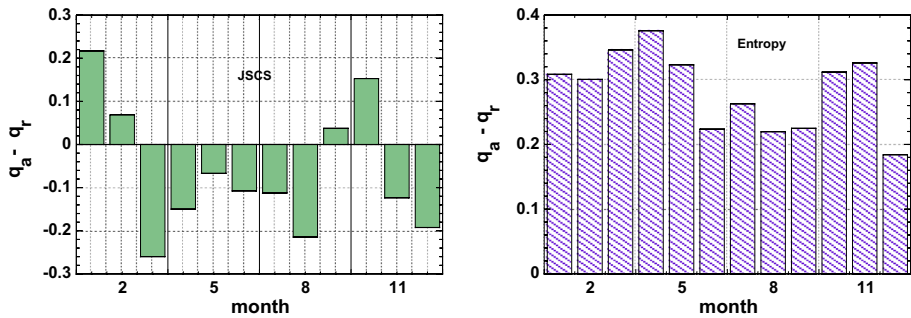
Fig. 6 Difference between accepted $(q_a \equiv [C_a^{(m)}/C_s^{(m])}])$ and rejected $(q_r \equiv [C_r^{(m)}/C_s^{(m])}])$ percentages of papers, when the number of such papers is aggregated in a given month for the examined time interval, (left) over (2012–2014) to *JSCS* or (right) over (2014–2016) to *Entropy*

Appendix

In this "Appendix", we discuss Eq. (6.2), graphically displayed in Fig. 6. In some sense, this equation assumes that all years are equivalent and data for each month can be superposed whatever the year. It has been shown in the main text that such an aggregation process leads to a more comfortable statistical analysis.

The *y*-axis scales appear to be markedly different in Figs. 5, 6. However the patterns are very similar, thus *a priori* allowing for such an aggregation process. The conclusions on seasonal effects drawn from both figures or equations, Eqs. (6.1), and (6.2), are therefore qualitatively similar.

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