Is writing style associated with peer reviewer recommendations?

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Introduction

Background

Peer review is the evaluation of scientific work by peer experts in one's discipline prior to release of the work to the public. In theory, a study with good reason, rigor, and reproducibility will pass peer review. However, other factors may influence the peer review process, including reviewer-level variables or article-level variables such as writing style. In one cross-disciplinary analysis of 5,094 journals, acceptance rates varied by journal discipline and correlated with the age of the journal, the impact factor of the journal, number of reviewers for each paper, and their editor's country of residence.[1] There is also evidence that studies with a prospective randomized controlled study design, appropriate statistical analysis, positive paper titles, and statistically significant study findings are associated with acceptance.[2–7]

Rationale

Our research teams and colleagues have often debated the potential advantages and potential drawbacks of a promotional writing style. We are interested in the influence, if any, of writing style on peer reviewer recommendation to accept.

Study Questions

In a randomized simulation-based experiment, we asked: (1) Are specific writing styles associated with recommendation for acceptance of a musculoskeletal experiment? And (2) Is the recommendation to accept a musculoskeletal experiment associated with peer reviewer ratings of the importance of specific manuscript characteristics?

Methods

Study design and setting

This study was approved by our Institutional Review Board. Members of the Science of Variation Group (SOVG) were invited to participate in this randomize simulation-based experiment, and 125 musculoskeletal surgeons completed the online experiment. The SOVG is an international collaborative of orthopedic, plastic, and general surgeons who treat musculoskeletal pathophysiology and participate in monthly experiments that investigate reliability and variation in care. We welcome diversity and all surgeons who perform musculoskeletal procedures are invited to join the SOVG (https://www.surveymonkey.com/r/SOVG_FB).

Description of experiment, treatment, or surgery

Ten manuscripts published in the Journal of Bone & Joint Surgery (JBJS) were selected. For each of the ten manuscripts, researchers rewrote the four different versions of an abstract with a different writing style: technical, scientific, promotional, and dispassionate.

Variables, outcome measures, data sources, and bias

The simulation-based experiment first measured participant familiarity with the peer review process. Participants with no peer-reviewing experience were excluded. Each participant was randomly shown one version of each of the 10 abstracts. Participants rated each according to the peer review scoring system used by the Journal of Bone and Joint Surgery.

Statistical analysis, study size

We conducted descriptive statistics to summarize the characteristics of study participants (Table 1). Multilevel logistic regression was used to analyze the relationship between the dichotomized rating of accept or reject and the ratings of the importance of various aspects of peer review and abstract writing style. We evaluated Odds Ratios for each variable. For level-2 effects, we calculated a Variance Partition Coefficient (VPC) and plotted probability of recommendation to accept with 95% confidence intervals for each writing style (Figure 1).

Table 1. Peer reviewer survey responses (N = 125)

Discrete Variables	Value % (number)
Re-written Abstract Ratings	
Acceptable	16% (201)
Valuable but Incomplete	30% (373)
Interesting but has Serious Concerns	28% (350)
Not Suitable	26% (326)
Gender	
Men	92% (115)
Women	8.0% (10)
Practice location	
United States	49% (61)
Europe	31% (39)
Other	20% (25)
Years in practice	
0-5	28% (35)
6-10	19% (24)
11-20	31% (39)
21-30	22% (27)
Subspecialty	
Fracture surgery	34% (43)
Hand and wrist	31% (39)
Shoulder and elbow	18% (23)
Other	16% (20)
Supervising trainees	89% (111)

Continuous Variables	Median (IQR)
Experience (years)	10 (8-15)
Average time to review manuscript (hours)	2 (1-3)
Most important manuscript characteristics (ranked, 1 - 8)	
Methodology	1 (1-2)
Originality	2 (1-3)
Organization	4 (3-5)
Statistical analysis	4 (3-5)
Clarity of tables/figures	5 (4-6)
Grammar and spelling	6 (5-7)
Quality of references	6 (5-7)
Number of references	8 (7-8)

Discrete variables as percentage (number); Continuous variables as median (interquartile range).

Results

Are specific writing styles associated with recommendation for publication?

Writing style accounted for 2.7% of variance in recommendation to accept. Technical style was the most favorable, followed by dispassionate, then scientific; and promotional style was the least favorable (Table 2, Figure 1). Using multilevel logistic regression, abstract acceptance was also associated with the reviewer factors self-reported greater time spent reviewing a paper (OR: 1.10; 95% CI 1.02-1.19) and fewer years of peer reviewing experience (OR: 0.98, 95% CI: 0.96-0.99).

Is the recommendation to accept a musculoskeletal experiment associated with peer reviewer ratings of the importance of specific manuscript characteristics?

Using multilevel logistic regression, abstract acceptance was associated with lower ratings of the importance of methodology and number of references (OR: 1.29, 95% CI: 1.12-1.50; OR: 1.34, 95% CI: 1.14-1.57 respectively; Table 2).

Discussion

The peer-review process for scientific publications is subject to conscious and unconscious human bias.[8] In a simulation-based experiment that varied writing style of scientific abstracts and asked surgeon scholars for their peer review determinations, we found that personal characteristics of peer reviewers, including a modest susceptibility to jargon, may influence the peer review process.

Limitations

The results of this study should be interpreted in light of the following limitations. Our experiment was performed with an international group of respondents, some of whom speak English as a second language, which might influence the interpretation of writing style.

Are specific writing styles associated with recommendation for acceptance of a musculoskeletal experiment?

The observation that a technical writing style was modestly associated with recommendation to accept suggests that reviewers may be swayed by jargon and suggests that self-promotion is not an effective strategy. The observation that less experience and efficiency of peer reviewers is associated with recommendation to accept is inconsistent with a study where two non-authentic, but realistic, manuscripts with a number of common methodological flaws were reviewed by 156 Scandinavian family medicine, internal medicine, and general surgery peer reviewers and an association was found between younger peer reviewers and stricter manuscript assessments as assessed on a 5-point rating scale.[9]
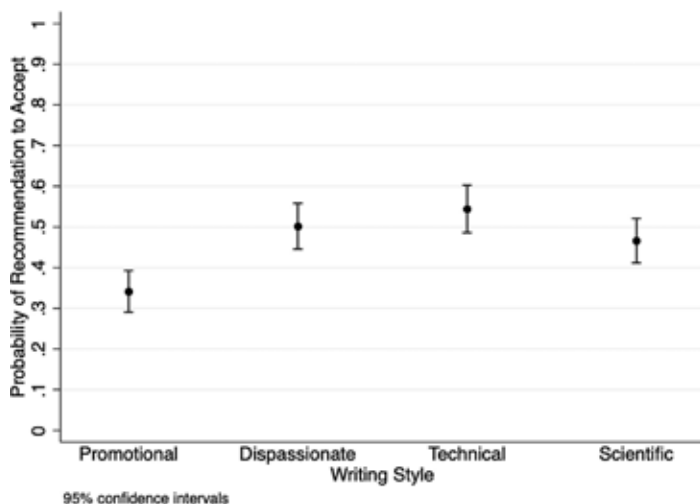
Figure 1. The probabilities of a recommendation to accept for 4 different writing styles.

Table 2. Multilevel Logistic Regression Model Parameter Estimates for abstracts receiving a Recommendation to Accept rating in JBJS Peer Review (n=1,250)

Variable	Estimate	95% C.I.
Fixed Effects	*Odds Ratio*	
Hours spent peer reviewing a paper (1-10)	**1.10**	**1.02, 1.19**
Years experience peer reviewing	**0.98**	**0.96, 0.99**
Importance of the following characteristics of a scientific paper [1 (the most important) – 7 (not important at all)]		
Originality	1.06	0.95, 1.20
Organization	0.96	0.86, 1.07
Statistics	1.01	0.89, 1.14
Methodology	**1.29**	**1.12, 1.50**
Grammar	0.96	0.86, 1.07
Number of References	**1.34**	**1.14, 1.57**
Quality of References	0.97	0.86, 1.10
Random Effects	*Variance*	
Writing Style	**0.09**	**0.02, 0.44**
VPC For Abstract Type (%)	2.7	

Bold indicates statistical significance (p<0.05)

VPC = Variance Partition Coefficient

Is the recommendation to accept a musculoskeletal experiment associated with peer reviewer ratings of the importance of specific manuscript characteristics?

The finding that recommendation for manuscript acceptance is associated with lower ratings on the importance of methodology and number of references are discordant with prior research and might be specific to musculoskeletal surgeons. For instance, a prospective cohort study of 1,107 manuscripts submitted to the *British Medical Journal*, *Lancet*, and *Annals of Internal Medicine* which found that submitted manuscripts are more likely to be published if they are rated as having high methodological quality.[10] Another study of 445 reviews of 196 papers by 335 peer reviewers with ratings of rhetoric, structure, science, and import also found an association between manuscript acceptance and higher peer reviewer ratings of scientific content and structure.[11]

Conclusions

Our findings confirm that the personal reviewer factors, including a modest influence of writing style, are associated with recommendations to publish, and that a promotional writing style is not effective. Editors and editorial staff can be attentive to the human element of manuscript evaluation.

References

1. Sugimoto CR, Larivière V, Ni C, *et al.* Journal acceptance rates: A cross-disciplinary analysis of variability and relationships with journal measures. *J Informetr* 2013; 7: 897–906.

2. Basilious A, Benavides Vargas AM, Buys YM. Publication rate of abstracts presented at the 2010 Canadian Ophthalmological Society Annual Meeting. *Canadian Journal of Ophthalmology* 2017; 52: 343–348.

3. Easterbrook PJ, Gopalan R, Berlin JA, *et al.* Publication bias in clinical research. *The Lancet* 1991; 337: 867–872.

4. Ha TH, Yoon DY, Goo DH, *et al.* Publication Rates for Abstracts Presented by Korean Investigators at Major Radiology Meetings. *Korean J Radiol* 2008; 9: 303.

5. Muffly TM, Webster K, Conageski C, *et al.* Predictors of Manuscript Publication. *Female Pelvic Med Reconstr Surg* 2016; 22: 83–87.

6. Treanor L, Frank RA, Cherpak LA, *et al*. Publication bias in diagnostic imaging: conference abstracts with positive conclusions are more likely to be published. *Eur Radiol* 2020; 30: 2964–2972.

7. Winnik S, Raptis DA, Walker JH, *et al.* From abstract to impact in cardiovascular research: factors predicting publication and citation. *Eur Heart J* 2012; 33: 3034–3045.

8. McKenzie ND, Liu R, Chiu A V., *et al.* Exploring Bias in Scientific Peer Review: An ASCO Initiative. *JCO Oncol Pract* 2022; 18: 791–799.

9. Nylenna M. Multiple Blinded Reviews of the Same Two Manuscripts. *JAMA* 1994; 272: 149.

10. Lee KP, Boyd EA, Holroyd-Leduc JM, *et al.* Predictors of publication: characteristics of submitted manuscripts associated with acceptance at major biomedical journals. *Medical Journal of Australia* 2006; 184: 621–626.

11. Kliewer MA, DeLong DM, Freed K, *et al.* Peer Review at the American Journal of Roentgenology: How Reviewer and Manuscript Characteristics Affected Editorial Decisions on 196 Major Papers. *American Journal of Roentgenology* 2004; 183: 1545–1550.