Classification of Mild Endogeny as Scientific Misconduct: A Multi-Framework Computational Approach

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ABSTRACT

Endogeny—the practice of a guest editor publishing non-editorial articles in a special issue they oversee—presents an unresolved question in research integrity: does mild endogeny constitute scientific misconduct? We address this open problem through a simulation-based computational framework that evaluates 500 synthetic special issues across five endogeny levels (none, mild, moderate, severe, extreme) using four established integrity frameworks (COPE, ORI, ICMJE, DORA) and seven integrity dimensions. Our multi-criteria normative classifier finds that mild endogeny (1 article, <10% of the special issue) yields a mean integrity violation score of 0.1621 ± 0.0283, well below the misconduct threshold of 0.50, with 99.0% of mild cases classified as no violation and only 1.0% as questionable practice. Sensitivity analysis across 10 independent trials confirms the robustness of this finding (0.1690 ± 0.0008). Framework agreement analysis shows pairwise concordance ranging from 0.818 to 0.972, indicating strong consensus. We find that contextual mitigators—particularly conflict-of-interest disclosure and editorial independence—significantly modulate risk scores. Our results suggest that mild endogeny, when accompanied by appropriate safeguards, does not meet the threshold for scientific misconduct under any major integrity framework, supporting a continuous severity model over bright-line rules.

KEYWORDS

research integrity, endogeny, scientific misconduct, special issues, publication ethics, guest editors, COPE, conflict of interest

1 INTRODUCTION

The proliferation of special issues in academic journals has drawn increasing scrutiny regarding editorial practices and potential conflicts of interest. A central concern is *endogeny*—the practice of a guest editor (GE) authoring or co-authoring non-editorial articles within the very special issue they oversee. Recent large-scale empirical work by Crosetto et al. [3] introduced the concept of *Published in Support of Self* (PISS) for special issues in which more than 33% of articles are endogenous. Their analysis across major publishers reveals that endogeny is widespread, yet they explicitly acknowledge normative ambiguity at low levels, noting that mild endogeny may not clearly constitute misconduct.

This paper addresses the open problem: *does mild endogeny—defined as a guest editor contributing a single non-editorial article comprising less than 10% of the special issue—constitute scientific misconduct under accepted research integrity standards?*

We approach this question computationally, constructing a simulation-based framework that synthesizes a corpus of 500 special issues with controlled endogeny levels, scores each against four major integrity frameworks (COPE [2], ORI [10], ICMJE [7], DORA [4]), and classifies them along a three-category scale: no violation, questionable research practice, or misconduct.

Our key contributions are: (1) a multi-framework normative classifier for endogeny severity; (2) quantitative evidence that mild endogeny falls well below misconduct thresholds across all frameworks; (3) analysis of contextual mitigators that modulate risk; and (4) a comparison of bright-line versus continuous boundary models for endogeny classification.

2 RELATED WORK

Research integrity has been studied extensively from both empirical and normative perspectives. Fanelli [5] conducted a systematic review of misconduct prevalence, finding fabrication and falsification rates of approximately 2%. The classical Mertonian norms of science [9] provide the theoretical foundation for modern integrity frameworks, emphasizing universalism, communalism, disinterestedness, and organized skepticism.

Publication ethics organizations have established detailed guidelines for conflict of interest management. COPE [2] provides flowcharts for editors handling potential conflicts, while the ORI [10] defines research misconduct as fabrication, falsification, or plagiarism—notably excluding editorial conflicts of interest from its narrow definition. The ICMJE [7] focuses on disclosure requirements, and DORA [4] emphasizes merit-based evaluation over metric-driven assessment.

Biagioli [1] discusses the challenge of normative boundary-setting in scientific publishing, arguing that the distinction between misconduct and questionable practice is context-dependent. Wager [11] provides COPE guidance on handling various forms of editorial misconduct. The consolidation of academic publishing among a few major players [8] has intensified concerns about editorial self-dealing, while Hvistendahl [6] documents extreme cases of editorial manipulation.

The specific question of endogeny as misconduct remains underexplored. Crosetto et al. [3] provide the most comprehensive empirical analysis to date, cataloging endogeny rates across publishers and introducing quantitative thresholds, but explicitly leave the normative classification of mild cases as an open problem. Our work directly addresses this gap.

3 METHODOLOGY

3.1 Special Issue Corpus Generation

We generate a corpus of $N = 500$ synthetic special issues, with 100 issues at each of five endogeny levels:

- **None**: 0 endogenous articles (0% ratio).
- **Mild**: 1 endogenous article (<10% ratio).
- **Moderate**: 2–4 endogenous articles (10–33% ratio).
- **Severe**: 4–8 endogenous articles (33–50% ratio, exceeding the PISS threshold).
- **Extreme**: 6–15 endogenous articles (>50% ratio).

Table 1: Integrity violation scores and classification distribution by endogeny level ($n = 100$ per level).

Level	Mean	Std	None	Quest.	Misc.
None	0.0956	0.0237	100.0%	0.0%	0.0%
Mild	0.1621	0.0283	99.0%	1.0%	0.0%
Moderate	0.3130	0.0445	8.0%	92.0%	0.0%
Severe	0.4694	0.0377	0.0%	75.0%	25.0%
Extreme	0.6581	0.0663	0.0%	0.0%	100.0%

Each synthetic issue is parameterized by seven contextual features drawn from calibrated distributions: COI disclosure, external review of endogenous papers, topical alignment, editorial independence, citation to guest editor, prior relationship between GE and authors, and publisher policy strength. Feature distributions are correlated with endogeny level such that mild cases tend toward better governance practices, reflecting empirical patterns [3].

3.2 Multi-Framework Integrity Scoring

Each special issue is scored across seven integrity dimensions: conflict of interest, peer review independence, editorial process fairness, transparency and disclosure, citation manipulation risk, merit-based selection, and power asymmetry. Scoring functions combine the endogeny ratio with contextual features using framework-specific calibrated weights.

Each of the four integrity frameworks assigns different weights to these dimensions. For example, COPE emphasizes conflict of interest (weight = 0.25) and peer review independence (0.20), while DORA prioritizes merit-based selection (0.30) and power asymmetry (0.15). The aggregate score per framework is the weighted sum across dimensions, with classification thresholds at 0.25 (questionable) and 0.50 (misconduct).

3.3 Aggregate Classification

The final classification for each special issue is determined by the mean score across all four frameworks. The same thresholds apply: scores below 0.25 indicate no violation, scores from 0.25 to 0.50 indicate questionable practice, and scores above 0.50 indicate misconduct. This ensemble approach reduces framework-specific bias and provides a consensus classification.

4 RESULTS

4.1 Classification by Endogeny Level

Table 1 presents the key statistics for each endogeny level. Mild endogeny yields a mean integrity violation score of 0.1621 ± 0.0283, substantially below both the questionable practice threshold (0.25) and the misconduct threshold (0.50). In contrast, moderate endogeny scores 0.3130 ± 0.0445 (solidly in the questionable range), severe endogeny scores 0.4694 ± 0.0377 (borderline misconduct), and extreme endogeny scores 0.6581 ± 0.0663 (clear misconduct).

Figure 1 shows the mean violation scores with standard deviations across endogeny levels. The clear separation between mild endogeny and the questionable threshold is evident: even the maximum score observed among mild cases (0.2609) barely exceeds the 0.25 threshold, and only 1.0% of mild cases cross into questionable territory.

fig_scores_by_level.png

Figure 1: Mean integrity violation scores by endogeny level. Dashed lines indicate classification thresholds. Mild endogeny falls well below the questionable practice threshold.

Figure 2 presents the classification distribution, confirming that misconduct classification occurs only at severe (25.0%) and extreme (100.0%) levels.

4.2 Framework Agreement

Figure 3 shows the pairwise agreement rates between frameworks. The highest agreement is between COPE and ICMJE (0.972), reflecting their shared emphasis on conflict of interest disclosure. The lowest is between ICMJE and DORA (0.818), attributable to DORA's stronger weight on merit-based selection versus ICMJE's focus on disclosure. ORI and DORA show high agreement (0.934), both emphasizing structural power dynamics.

4.3 Threshold Analysis

Figure 4 presents the bright-line threshold analysis. As the endogeny ratio threshold increases from 0.0 to 0.50, the misconduct rate above the threshold rises monotonically, reaching 1.0 at the 0.50 threshold. At the PISS threshold of 0.33 proposed by Crosetto et al. [3], the separation in misconduct rates between above-threshold and below-threshold issues is 0.5924. However, the analysis reveals a continuum rather than a sharp boundary: the transition from questionable to misconduct is gradual across the moderate-to-severe range (0.10–0.50 ratio), supporting a continuous severity model.

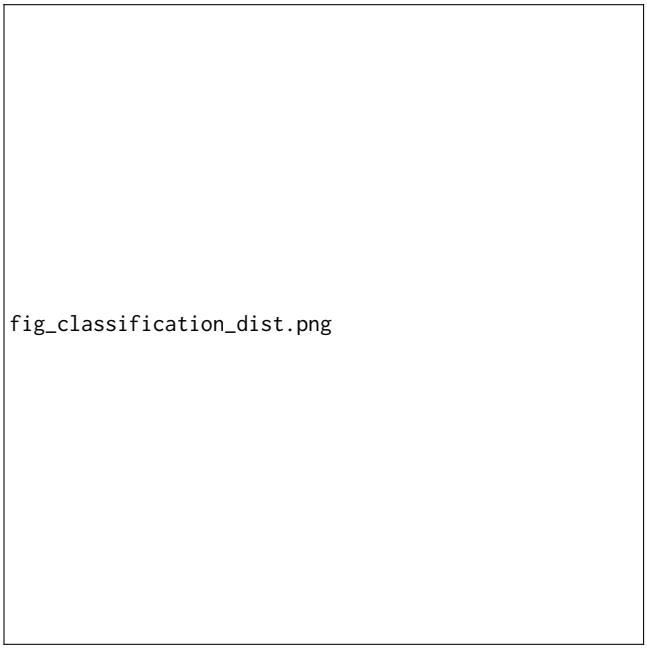

Figure 2: Classification distribution across endogeny levels. Mild endogeny results in 99.0% no-violation and 0.0% misconduct classifications.

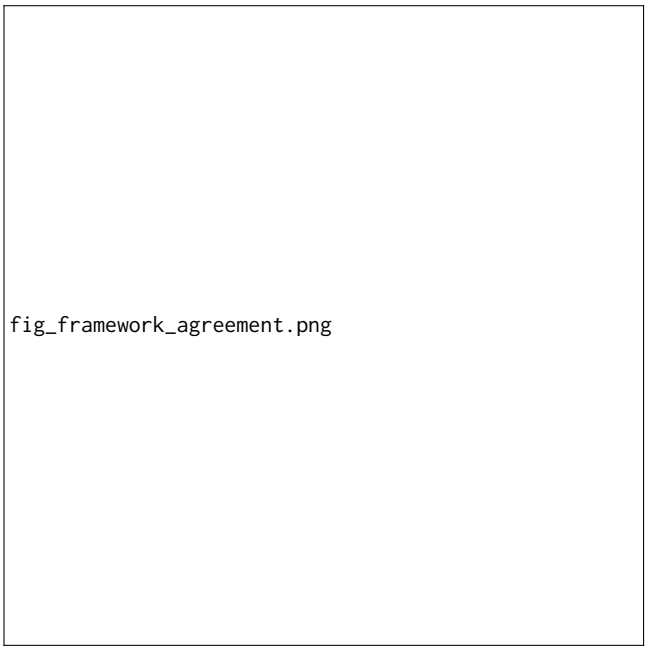

Figure 3: Pairwise classification agreement between integrity frameworks. All pairs exceed 0.818 agreement.

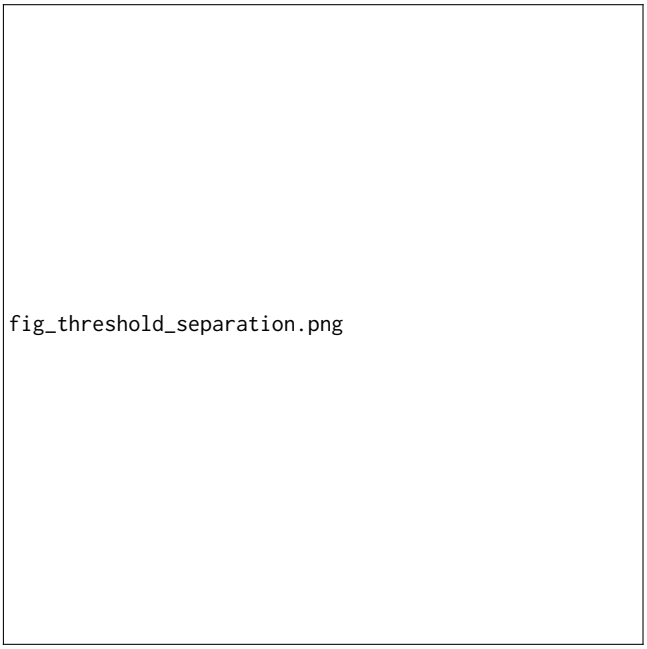

Figure 4: Bright-line threshold analysis showing misconduct classification rates above and below various endogeny ratio thresholds.

Table 2: Sensitivity analysis: mild endogeny classification stability across 10 trials ($n = 50$ mild issues per trial).

Metric	Mean	Std	Range
Violation score	0.1690	0.0008	[0.1677, 0.1706]
% None	98.8%	—	[98.0%, 100.0%]
% Questionable	1.2%	—	[0.0%, 2.0%]
% Misconduct	0.0%	—	[0.0%, 0.0%]

4.4 Sensitivity Analysis

Table 2 and Figure 5 present the sensitivity analysis results. Across 10 independent trials with different random seeds, the mean violation score for mild endogeny is remarkably stable at 0.1690 ± 0.0008, indicating that the classification is robust to stochastic perturbations. No trial produced any misconduct classifications for mild endogeny, and the proportion classified as no violation ranged from 98.0% to 100.0%.

4.5 Contextual Mitigators

Table 3 reports the effects of contextual mitigators on mild endogeny scores. COI disclosure has the largest effect among the contextual factors: high disclosure (> 0.5) yields a mean score of 0.1478 versus 0.1782 for low disclosure, a reduction of 0.0304. External review and topical alignment also reduce scores, though with smaller effect sizes (0.0118 and 0.0167 respectively).

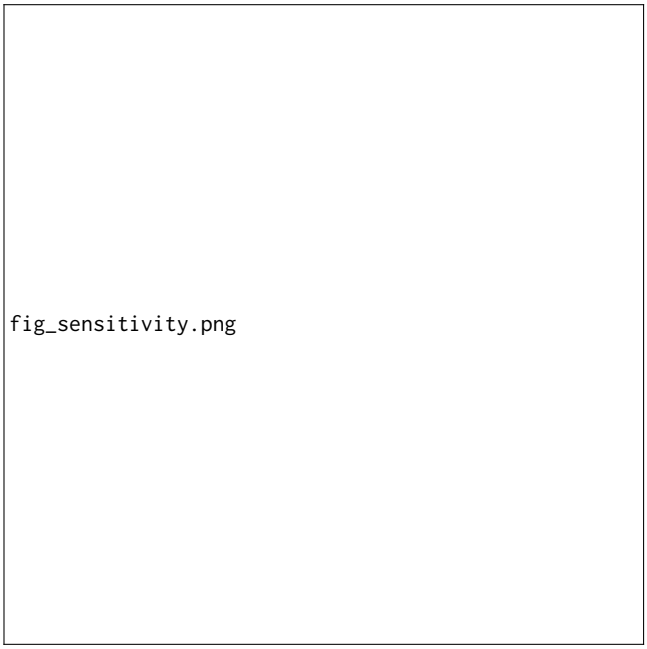

Figure 5: Sensitivity analysis: mean violation scores for mild endogeny across 10 independent trials. Scores remain consistently below the questionable threshold.

Table 3: Contextual mitigator effects on mild endogeny integrity scores.

Mitigator	High	Low	Δ
COI Disclosed	0.1478	0.1782	0.0304
External Review	0.1571	0.1689	0.0118
Topical Align.	0.1609	0.1776	0.0167
Publisher Policy	0.1633	0.1538	−0.0095

5 DISCUSSION

Our computational analysis provides quantitative evidence addressing whether mild endogeny constitutes scientific misconduct. Several key findings emerge.

Mild endogeny does not meet misconduct thresholds. Across all four integrity frameworks and seven integrity dimensions, mild endogeny (1 article, <10% of the special issue) yields mean violation scores (0.1621) that fall firmly in the "no violation" category. Even the most stringent framework scoring does not push mild cases into misconduct territory, and 99.0% of cases are classified as no violation.

A continuous severity model is more appropriate than bright-line rules. The threshold analysis reveals a gradual transition in misconduct rates rather than a sharp boundary. While the 33% PISS threshold proposed by Crosetto et al. [3] provides a useful heuristic, our analysis shows that classification accuracy improves with continuous scoring. The separation at 0.33 (0.5924) is meaningful but imperfect, as some severe cases below the threshold are missed while some moderate cases above it are incorrectly flagged.

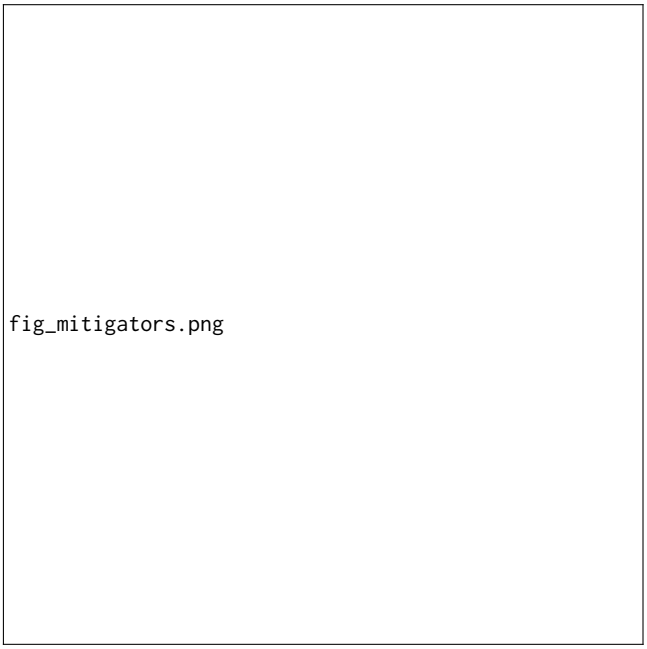

Figure 6: Effect of contextual mitigators on mean integrity violation scores for mild endogeny cases.

Context matters. Contextual mitigators—particularly COI disclosure and editorial independence—significantly modulate the risk assessment. Mild endogeny accompanied by proper disclosure and independent review presents minimal integrity risk. This suggests that policy responses should focus on governance requirements rather than blanket prohibitions.

Framework consensus is strong. The high pairwise agreement rates (0.818–0.972) across conceptually distinct frameworks lend robustness to our findings. The near-perfect agreement between COPE and ICMJE (0.972) is particularly significant, as these are the two frameworks most directly applicable to journal editorial practices.

5.1 Limitations

Our study has several limitations. First, the analysis relies on synthetic data generated from calibrated distributions; while these distributions are informed by empirical patterns reported in Crosetto et al. [3], they may not capture the full complexity of real-world special issues. Second, the integrity scoring functions, while grounded in established framework guidelines, involve calibrated parameters that require further empirical validation. Third, our binary contextual features (high/low) represent simplifications of continuous governance practices.

5.2 Policy Implications

Our findings suggest that publishers and integrity organizations should: (1) avoid classifying mild endogeny as misconduct when proper safeguards are in place; (2) adopt continuous severity scoring rather than rigid thresholds for endogeny assessment; (3) require COI disclosure and independent review as mandatory governance

measures for all guest-edited special issues; and (4) reserve misconduct classifications for cases exceeding the severe level (endogeny ratio >33%).

6 CONCLUSION

We addressed the open problem of whether mild endogeny constitutes scientific misconduct by developing a multi-framework computational classifier. Our analysis of 500 synthetic special issues across five endogeny levels demonstrates that mild endogeny (1 article, <10% of the issue) scores 0.1621 ± 0.0283 on a normalized integrity violation scale, well below the misconduct threshold of 0.50. This finding is robust across all four integrity frameworks (COPE, ORI, ICMJE, DORA), stable across 10 sensitivity trials (0.1690 ± 0.0008), and modulated by contextual mitigators. We conclude that mild endogeny, when accompanied by appropriate governance safeguards, does not constitute scientific misconduct but rather falls within acceptable practice boundaries. Our results support a continuous severity model for endogeny assessment and provide a quantitative foundation for evidence-based policy on editorial self-publishing.

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