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# Perceptions and Predictors of Questionable Research Practices in the Biological Sciences

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## Abstract

A nationally representative sample of 429 biology researchers (40% response rate) from 107 R1 and masters universities assessed the features of six research scenarios and reported the probability they would take the same (questionable) action as the actor in the scenario. Results suggest that individual factors such as moral judgment and perceived internal and external consequences may play a larger role in research misbehavior than perceptions of organizational justice or other features of the research environment.

## Introduction

Studies have shown that serious misconduct in academic research (e.g., data fabrication) is uncommon, whereas questionable research practices (e.g., courtesy authorship) occur on a fairly regular basis (Fanelli, 2009). Yet limited research has been undertaken to understand why researchers engage in these behaviors (Martinson, Anderson, Crain, & DeVries, 2006; Mumford et al., 2009; Fanelli, Costas, & Lariviere, 2015), in spite of the critical attention that misconduct cases bring from scientists, policymakers, and the public. As in other areas of human endeavor, understanding the complex causes of misbehavior is critical in formulating appropriate prevention structures or remedies. In this study, biology faculty from R1 and masters universities (which have especially been understudied) shared their perceptions of what they would choose to do in certain circumstances, including those that involve high pressure (e.g., when evaluation for tenure is looming and publications are needed to ensure success). We also explored the role of other factors, such as perceptions of organizational justice and external funding expectations.

## Method

4,556 faculty from 107 randomly selected biology, psychology, social work, and sociology faculty from U.S. R1 and Masters Large universities were invited to participate using a mixed-mode methodology (Dillman, Smyth, & Christian, 2008), with a 40% response rate.

- Final  $n = 1735$  across disciplines
  - 53% from R1 universities
  - 25% from biology ( $n = 429$ )
- Responded to 6 research vignettes (Mumford et al., 2006) indicating:
  - How likely it is that they would have acted the same in the situation (0-100%; *likelihood*).
  - How harmful the action was (1-5; *harm*)
  - How likely they would feel guilt/shame (0-100%; *shame*)
  - How morally wrong they and their colleagues would say it is (1-5; 2 items;  $\alpha = .78-.91$ ; *wrong*)
  - Probability of being caught by colleagues, administration, or funders/publishers (0-100%; 3 items;  $\alpha = .65-.90$ ; *known*)
  - Probability of negative outcomes from others (0-100%; 2 items;  $\alpha = .74-.88$ ; *sanctions*)

- Also provided information on departmental and university distributive and procedural justice perceptions ( $\alpha = .92-.94$ ), and various individual level factors such as gender, grant expectations, and research experience

Figure 1. Probability P would do the same by scenario



Table 1. Predictors of likelihood of action

	Changes w/o IRB approval	Delete suspicious data	Reneges on authorship	COI in employ	Overlook billing	COI in peer review
Gender	.001	-.01	-.08	<b>-.13</b>	.01	.07
Year of PhD	<b>.13</b>	<b>.17</b>	<b>.11</b>	<b>.14</b>	<b>.03</b>	<b>.29</b>
$R^2$	<b>.02</b>	<b>.03</b>	<b>.02</b>	<b>.04</b>	<b>.001</b>	<b>.08</b>
Shame	<b>-.22</b>	<b>-.25</b>	<b>-.16</b>	<b>-.34</b>	<b>-.30</b>	<b>-.22</b>
Harm	<b>-.13</b>	<b>-.19</b>	-.10	<b>-.17</b>	<b>-.20</b>	-.10
Wrong	<b>-.29</b>	<b>-.32</b>	<b>-.43</b>	<b>-.29</b>	<b>-.33</b>	<b>-.44</b>
Sanctions	-.09	-.02	.08	-.04	<b>.12</b>	.06
Known	-.01	<b>.12</b>	-.02	.05	-.09	-.01
Admin	-.09	-.03	-.02	-.02	-.03	-.05
Assoc Prof	<b>-.18</b>	<b>-.16</b>	-.02	-.08	-.07	-.09
Full Prof	<b>-.23</b>	<b>-.17</b>	-.03	<b>-.18</b>	<b>-.17</b>	-.13
Other	-.01	<b>-.10</b>	.01	.003	-.07	-.02
University type	.05	.01	<b>.12</b>	.03	.03	.02
$R^2$	<b>.37</b>	<b>.44</b>	<b>.35</b>	<b>.51</b>	<b>.44</b>	<b>.48</b>

Note: Standardized Beta weights and  $R^2$  in bold are significant,  $p < .05$ . 1 = Female, 1 = R1 instit.

## Results

- Participants did not report high likelihoods of misconduct, although they were more likely to report that they would delete data, act on a conflict of interest, or overlook a possible error in billing than they were to report that they would make changes to their protocol without IRB approval or renege on a promise of authorship to a student,  $F(5,377)=12.48, p < .001, \eta_p^2 = .14$  (Figure 1).
- We examined several predictors of likelihood of action (log transformed). In the first step, we entered control variables (gender, year of PhD; other variables—e.g., percentage of time in research, IRB and IACUC experience, and number of publications—had no effect).
- Although the effect sizes were small, for each scenario, more recent PhDs were more likely to report that they would engage in the action.
- We then entered self-report variables related to the scenario as well as position (dummy coded) and type of university.
- Across scenarios, participants were less likely to report that they would take the action to the extent they thought they would feel ashamed and that they and colleagues would think it was wrong. Perceptions of harm predicted to a lesser extent (Table 1).
- Neither distributive justice nor procedural justice, at the department or the university level, or an interaction between how wrong participants felt the action was and the extent to which they believed they would be sanctioned predicted action for any scenario.

## Discussion

Moral judgment and potential associated feelings of guilt or shame were the most consistent predictors of biology faculty's perceived likelihood of engaging in questionable research practices (QRPs). The perceived likelihood of harm also appeared to affect their perceived actions, and more recent PhDs and assistant professors reported a greater likelihood of engaging in QRPs.

Contrary to expectations, individuals from R1 institutions did not report a higher perceived likelihood of engaging in QRPs than those from Masters universities. Other institutional variables likewise had little effect on decisions to engage in questionable research practices. Instead, training and intervention efforts may need to emphasize the wrongness and potential harm that can be caused by these practices.

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