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Ethics & Behavior

Rational Choice and Moral Decision-Making in Research

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ABSTRACT

University psychology and sociology researchers rated the likelihood they would engage in misconduct as described in nine research scenarios, while also making moral judgments and rating the likelihood of discovery and sanctions. Multiple regression revealed significant effects across various scenarios for moral judgment as well as shame and embarrassment on reducing misconduct. The effects on misconduct of the perceived probability of sanctions were conditioned on moral judgments in some scenarios. The results have implications for how universities address the prevention, detection, and sanctioning of research misconduct.

Keywords: research misconduct, rational choice, moral decision-making, academic ethics

INTRODUCTION

Background

Research misconduct is defined in federal regulations as Fabrication, Falsification, or Plagiarism (FFP) in proposing, performing, or reviewing research or in reporting research results. This definition of research misconduct does not, however, exhaust the realm of unethical research behavior; less serious offenses are sometimes referred to as Questionable Research Practices (QRPs). QRPs are actions that violate traditional values of the research enterprise and that may be detrimental to the research process, including everything from rounding down *p* values (John, Lowenstein, & Prelec, 2012) to misrepresenting speculations as fact (U.S. National Academies of Science, 1992, p.6).

A meta-analysis of the prevalence studies published to date found that between .3% and 4.9% of scientists have reportedly fabricated or falsified research data (Fanelli, 2009). An average of 33.7% of respondents in these studies also admitted to engaging in other Questionable Research Practices. However, 84% of the 2,599 funded researchers in another study reported observing at least one case of what they considered scientific error or other misbehavior of one kind or another (Koocher, Keith-Spiegel, Tabachnick, Sieber, & Butler, 2010). John, et.al. (2012), found that the mean admission rate among psychologists across ten QRPs was 36%, with 94% of respondents admitting to having engaged in at least one of the listed behaviors.

The purpose of this study was to investigate how and why misconduct occurs. With a focus on two social science fields, this exploratory investigation examined the possible

application of rational choice theory to research misconduct by faculty researchers, grounded in a model of moral decision-making. The goal was to explore the pathways that may lead to a decision to engage in research misconduct of various kinds, both serious and less serious, including those actions seen as very morally wrong as well as those with perhaps more ambiguous moral dimensions.

Theoretical Foundation

One framework for this investigation was the four-component model of moral decision-making that was developed by James Rest and colleagues as an outgrowth of the theoretical work of Lawrence Kohlberg on moral development (Rest, 1984). This model has been extensively studied (Trevino, Weaver, & Reynolds, 2006) and provides a solid foundation for exploring how ethical and unethical decisions are made. The four components are: (a) moral awareness or sensitivity, which involves the individual assessing and interpreting a given situation, whether a moral issue is present and how various actions might affect others and themselves; (b) moral judgment or reasoning, the component most studied by researchers, described as the individual identifying what the moral course of action is in the situation and thus what one ought to do; (c) moral motivation or intent, which is developing an intention to take the moral action by prioritizing the moral values involved over other personal values the individual has identified to be at play in the situation; and (d) moral character or action, involving the actual execution of the action selected.

Rational choice theory (RCT) also has empirical support in explaining various types of misbehavior, including academic cheating (Cochran, Chamlin, Wood, & Sellers, 1999; King &

Mayhew, 2002; Michaels & Miethe, 1989; Nagin & Paternoster, 1993; Tibbetts, 1997; Tibbetts & Gibson, 2002; Tibbetts & Myers, 1999) and corporate crime (Paternoster & Simpson, 1996; Simpson, Paternoster, & Piquero, 1998). Grounded in the philosophy of utilitarianism, rational choice or rational action perspectives on behavior have their roots in economics (Tittle, Antonaccio, Botchkovar, & Kranidioti, 2010), and serve as a framework for explaining decision-making in terms of the more or less rational assessment of threats/costs/risks versus benefits/pleasures of a given action.

Several key features or elements seem to be central to most concepts of rational choice, which are: (a) maximation according to individual variation - an individual will make the choice that has the most expected value, considering the options; (b) consequentialism – a rational choice assessment will include the possible consequences of the various choices; (c) individual-act orientation – the individual will only consider those consequences that are caused by the specific action s/he is considering, not those that might come about for other reasons; and (d) unlimited intelligence – rational people have a theoretically unlimited capacity to use reason and process information (Lahno, 2007).

Several studies have examined aspects of morality in concert with rational choice. For example, Paternoster and Simpson (1996) found that rational choice factors were only important in the intent to commit corporate crime when individuals were not restrained by moral considerations. Other studies provide support for this idea as well (Kroneberg, Heintze, & Mehlkop, 2010; Reynolds & Ceranic, 2007; Sierra & Hyman, 2008; Tittle, et al., 2010).

Among the individual costs that have been studied in relation to rational choice in the area of academic cheating is the concept of shame. Although "shame proneness" as a stable trait has been shown to lead to increased deviance (Tangney, Stuewig, & Mashek, 2007; Tibbetts, 1997), anticipated shame as an emotion has been associated with decreased cheating intentions and criminal behavior (Cochran, et al., 1999; Grasmick & Bursik, 1990; Rebellon, Piquero, Piquero, & Tibbetts, 2010; Tibbetts, 1997). Anticipated shame, or actual feelings of shame or embarrassment, may in fact mediate between the expectation of sanctions and criminal behavior (Nagin & Paternoster, 1993; Rebellon, et al., 2010; Tibbetts & Myers, 1999). More broadly, Rebellon, et al., (2010) proposed that anticipated shame may serve as a common mechanism among various criminological theories, including self-control theory, strain theory, and differential association theory.

Research Questions

This study examined the following research questions: (1) To what extent do rational choice factors predict the intention to commit research misconduct? (2) To what extent does the awareness of and judgment regarding a moral component predict the intention to commit research misconduct? (3) Are moral judgments associated with rational choice assessments? In particular, it tested the hypothesis that a cost-benefit analysis is less likely to predict misconduct in situations when individuals judge the potential action as morally wrong, as compared to those actions that are ambiguous or not considered morally wrong.

METHOD

Sample

The study participants were full-time tenured and tenure track faculty from psychology and sociology departments at U.S. research universities. The method used to identify members of the study population was to randomly order a list of RU-VH (Research Universities-Very High research activity) doctoral degree-granting research universities in the United States (*n*=96), as compiled by the Carnegie Foundation for the Advancement of Teaching in 2011. A pilot sample of 130 faculty was drawn from the bottom three universities on the randomly ordered list, using all full-time faculty members from the two departments in the three institutions. For the full survey phase, all full-time members of each department were drawn from the institutions at the top of the list until the sample reached at least 2,000, yielding a total of 2,119 individuals from 40 universities. The faculty list from each institution was itself then randomly ordered, and 1,100 names were assigned to initially receive surveys through the mail, the remainder to be invited to participate through the online Survey Monkey software program. After removing names with invalid address information, the final sample sizes in the full study phase were 1,069 postal mail invitations and 1,001 invitations by email only.

Procedures

All participants were invited by postal mail or by Survey Monkey email to complete an anonymous self-administered survey instrument about decision-making in research. All study components were reviewed and determined to be Exempt by the Institutional Review Board.

The *Mixed* sample received invitations through postal mail and then non-respondents also received follow-up emails from Survey Monkey; thus surveys from this group came in via both avenues. The *Online* sample participants were contacted and invited to participate only by email from Survey Monkey. The procedures for the postal mailings included a cash incentive (a $ 2 bill), pre-notification by postcard, stamped return envelope and separate stamped completion postcard, multiple reminder follow-ups, and university sponsorship, all methods shown to be effective in enhancing response rates (Church, 1993; Dillman, 2000; Porter & Whitcomb, 2003). Administration of the full survey was initiated in mid-spring semester, 2012. The Online sample procedures did not include the pre-notification since all contacts were by email from Survey Monkey, and no cash incentive was offered. Anonymity in this study was assured by having survey data stored separately from email addresses in Survey Monkey, and by encouraging participants to avoid providing any identifying information on survey materials. Response rates ranged from 28% in the *Postal Mail only* pilot study, 20% from the *Online only* sample, and 35% from the *Mixed* sample. The analyses and results described in this paper are based on the full phase combined sample of 581 respondents from 40 institutions.

Instrument and Measures

The survey instrument presented nine scenarios depicting various types of research misconduct and/or questionable research practice, each followed by questions eliciting the respondent perceptions regarding certain moral and rational choice issues. The scenarios were adapted from the social science version of the *Ethical Decision-Making Measures (EDM's)* created by Mumford, et.al. (2006). Several strategies were used to establish the validity and reliability of

the *EDMs* (Mumford, et al., 2006).   All adapted scenarios depict an untenured assistant professor conducting research and looking forward to (and under the pressure of) publishing the results and obtaining tenure. Three of the scenarios were selected because they fit the regulatory definition of misconduct (FFP) and the remaining six were categorized as QRP's, with the assistance of field experts. The text of the scenarios is available in the appendix.

Tibbetts and other authors have recommended the scenario approach for research involving rational choice theory (Tibbetts & Gibson, 2002), which typically entails presenting respondents with hypothetical scenarios as a method of assessing an individual's likelihood of acting in a certain way. Researchers have used it in studies exploring rational choice theory in cheating, crime, and other moral decision-making studies (Nagin & Paternoster, 1993; Ogilvie & Stewart, 2010; Piquero, Exum, & Simpson, 2005; Piquero, Tibbetts, & Blankenship, 2005; Rebellon, et al., 2010; Reynolds & Ceranic, 2007; Seipel & Eifler, 2010; Sierra & Hyman, 2008; Simpson, et al., 1998; Tibbetts, 1999). A clear limitation to the use of scenarios is that intentions to engage in a particular behavior are not synonomous with actual behavior (Weber & Gillespie, 1998) and may not elicit emotions to the degree that may be necessary for certain kinds of research (Collett & Childs, 2011). However, research has shown that perceived intentions and behavior are associated with one another (Beck & Ajzen, 1991), and using this approach was intended to lessen the risk of response bias, particularly as compared to self-reports of actual research misconduct.

Data Analysis

Beyond descriptive analyses, the data analysis included t tests and tests of proportions for assessing group differences, as well as Ordinary Least Squares (OLS) regression for each of the nine scenarios separately, using selected variables and interaction terms. Responses from an individual for a given scenario were only included in the regression analyses if the individual answered all items for that scenario. The dependent variable in all regression models was Probability of Misconduct, the respondent's estimate of the likelihood s/he would take the same action as that depicted in each scenario.

RESULTS

Respondent Characteristics

Most respondents were White (90%), and split roughly in half by gender (47.5% female) and by discipline (51.7% Psychology, 46.8% Sociology, 1.6% Other). In addition, more than 90% were tenured or tenure track faculty; about 22% of the respondents were assistant professors, 23% were associate professors, and 46% were full professors. Additionally, all but 3% of the sample received their graduate training in the U.S. Forty-nine percent reported having observed what they would consider to be research misconduct in the past, and another 12.6% were not sure on that question. About 79% reportedly spend between 26% and 75% of their time conducting research; overall, the mean percent effort engaging in research was 55%.

Probability of Misconduct

In the first question under each scenario, respondents estimated the likelihood that they would take the same action as the hypothetical researcher did, referred to below as Probability of Misconduct. This item was addressing the moral intent component of the Rest four-component model of ethical decision-making (Rest, 1984). It was estimated by the respondent as a probability between 0 and 100%, and served as the dependent variable in subsequent analyses. The results are shown in Table 1 for each of the two sub-samples involved in the study, faculty from psychology and from sociology departments, with the three FFP scenarios listed first.

[Insert Table 1 about here]

The perceived Probability of Misconduct was highest on average for the scenario *Authorship to Gain Favor* for both disciplinary samples. Psychologists reported on average that there was a 41% likelihood they would do the same as the researcher in the scenario did under the same circumstances, and sociologists reported an average 37.3% likelihood. The least likely scenario for both groups was *Fabricated Data*, with psychologists reporting 1.7% likelihood of taking the action depicted and the sociologists 5.4%. Overall, the average response for the psychologists was about 4-6 percentage points lower than for the sociologists for several of the scenarios, including all three of the FFP scenarios. As shown, *t test* results demonstrate that some of these differences are statistically significant. Standard deviations on some of the scenarios were fairly high, however (not shown). The standard deviation for perceived Probability of Misconduct in the *Authorship to Gain Favor scenario,* for example, was about .30 for both groups.

Moral Assessment

The second item in the assessment of the scenarios involved respondents rating on a 5-point Likert scale the extent to which they perceived a moral dimension in the scenario. Ratings ranged from 1 (*Moral Dimension not present at all*) to 5 (*Moral Dimension clearly present*). This item was addressing Rest's moral sensitivity component. Unless the respondent chose "not applicable" for item 2, item 3 then invited a judgment in regard to how morally wrong the action depicted is, using a Likert scale of 1 (*not at all wrong*) to 5 (*very wrong*). This item was addressing Rest's moral judgment component. Results for both items are shown in Table 2 for the percentage of respondents that selected a 4 or 5 on the scale.

[Insert Table 2 about here]

The three scenarios rated most often by respondents overall as having a moral dimension were the three FFP scenarios for each group, followed closely by *Conflict of Interest* and *Reneges on Authorship*. Only 40.1% of overall participants perceived the scenario *Authorship to Gain Favor* as having a moral dimension. Ratings for Moral Judgment appear to parallel the Moral Dimension ratings, with the actions taken in the three FFP situations most often seen as wrong or very wrong, followed again by *Reneges on Authorship* and *Conflict of Interest*. Generally, the results for Moral Dimension and Moral Judgment trend in the same direction as those for Probability of Misconduct, suggesting perhaps that those who see a moral dimension in these scenarios may be more likely to view the action taken as wrong, and less likely to believe they would do it under the same circumstances. Also included in Table 2 are the breakdowns by discipline. The tests of proportions between the percentages on these items for each discipline

were statistically significant for only one scenario. Just under 9% fewer psychologists than sociologists reported seeing a moral dimension in and judging *Reneges on Authorship* as wrong.

The responses given on these two items were highly correlated with one another. The correlations for the nine scenarios ranged from 69% to 88%, all statistically significant at p<.001. A likely explanation for this is that these two items on the instrument may actually be measuring the same thing. It is possible that respondents did not fully perceive what was meant in regard to whether or not there was a moral dimension present in the scenario as distinct from judging the action itself as more or less wrong. Because these items appear to be measuring the same construct, only Moral Judgment was included in the regression models.

Rational Choice Assessment

Finally, questions 4 and 5 after each scenario invited respondents to assess the likelihood that the action would be "caught" or found out, discussed below as the Detection variables, and the likelihood of consequences if the action was in fact found out, referred to below as Internal Sanctions and External Sanctions. The probabilities for each of the detection and sanction items were recorded on a scale of 0-100% by the respondent.

Likelihood of detection. The average estimated likelihood of detection is shown in Table 3 for the following: (a) by a colleague in the department, (b) by a publisher when the article is

submitted for peer review[1]; and (c) by a university administrator or research oversight committee.

[Insert Table 3 about here]

Respondents on average estimated a probability of under 50% that a colleague would detect one of the FFP situations, and the estimated probabilities are even lower for publishers and administrators/review committees. Detection by a colleague in the department was seen as most likely on average by respondents, with the highest mean likelihood of detection being for the scenario *Reneges on Authorship* at 69.1%. The two lowest estimates of detection by publishers were in the scenarios involving *Authorship to Gain Favor* and *Reneges on Authorship*.

Likelihood of sanctions. Similar results are shown in Table 4 in regard to the seven sanction items included in the rational choice assessment, with the first two columns showing the results for what might be seen as "internal" sanctions-those more or less imposed on oneself (a and b), and the remainder as "external" sanctions-those that would be determined and applied by others (c-g).

[Insert Table 4 about here]

As shown, the highest estimated likelihood for the Internal Sanctions of Shame and Embarrassment, on average, was associated with the three FFP scenarios. The others were still fairly high as well, with a better than even chance that respondents would feel both shame and embarrassment in all but one of the scenarios, which is again *Authorship to Gain Favor.* The

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[1] In *Conflict of Interest*, this Detection item was changed to "the funder when the grant is submitted for review" because the scenario involved reporting a potential conflict of interest in a grant application.

latter is the scenario that respondents estimated had a 58% chance of being detected by colleagues, but less than a quarter of them felt it was wrong (17% of psychologists and 22% of sociologists).

In regard to the External Sanctions, again the three FFP scenarios had the highest likelihood across the scenarios, with one major exception. Respondents on average anticipated a mean 59% likelihood of being censured by a research review committee if they were caught engaging in *IRB noncompliance* and a mean 35% likelihood of being sanctioned from engaging in research for a period of time. They reported on average that there was almost a 9% chance one might be dismissed from the university in that scenario.

Composite variables. Three composite variables were created: (a) a composite Detection score, which is an average of all three detection items for each respondent; (b) a composite of Shame and Embarrassment, as the two Internal Sanctions; and (c) a composite of the External Sanctions, which included all of the remaining sanction items, Censure in File, Censure by Committee, Sanctioned from Engaging in Research; and Dismissal, except for Criminal Arrest and Prosecution, for which the probabilities were extremely low.. The Detection composite seemed to be a little less reliable than the other two, but all have acceptable reliability in the various scenarios (ranging from .61 to .95).

Regression Analysis

The results of a regression analysis for each of the nine scenarios are shown in Table 5. Results for the FFP scenarios are shown in the first three columns, followed by those for the QRP

scenarios. As can be seen, all of the coefficients for Moral Judgment are highly significant ($p \leq$ .001), suggesting that moral judgment may be a consistent predictor for research misconduct. In the scenario describing an unreported *Conflict of Interest*, for example, every step increase in the five-point Likert scale toward a judgment of wrongness led to a decrease in the estimated likelihood of this type of misconduct by 14.92 points. Results for the *IRB Noncompliance* scenario were among the lower statistically significant effects, where each step increase toward a judgment of wrongness reduced the estimated likelihood of misconduct by about 7.03 points.

As shown, the Detection composite did not predict the perceived likelihood of misconduct in most scenarios, although the effect was significant for *Reneges on Authorship*. Nor typically did the External Sanction composite, although three of these coefficients were also significant. However, the composite variable of Internal Sanctions (the Shame and Embarrassment composite) was a very consistent predictor of the perceived likelihood of misconduct. In all of the scenarios except Conflict of Interest, a statistically significant effect can be seen on estimated likelihood of misconduct from potential feelings of shame and embarrassment regarding the action described.

[Insert Table 5 about here]

Looking at the characteristics of the sample, one can see that the differences previously shown between sociologists and psychologists appear to be borne out in the regression. In seven of the scenarios, sociologists reported being approximately 3-6 points more likely to engage in the misconduct depicted than the psychologists. The exceptions were *Adjusted Reporting* and *Authorship to Gain Favor*, where any apparent differences were not statistically significant.

In regard to academic position, there were three scenarios in which full professors estimated they would be less likely to engage in the hypothetical misconduct than the referent group of assistant professors: *False Reporting*, *Reneges on Authorship*, and *Authorship to Gain Favor*. Perceived likelihood of misconduct was only different between males and females in one scenario, *IRB noncompliance*. In that scenario, male respondents were about 4.1 percentage points more likely than females on average to hypothetically *not* report the sample change to the IRB, under those circumstances. Any apparent differences in the other scenarios were not statistically significant. In a few of the scenarios, one can see large effect sizes related to Race, especially Asians compared to Whites, and Other compared to Whites. However, there were only two Others in the sample, and seven Asian/Pacific Islanders, and so the results may be artifacts of the low sample sizes. Finally, the results pertaining to percent time spent in research were significant in only one of the scenarios, *Fabricated Data,* where every percent increase in the time engaged in research led to an *increase* in the perceived likelihood of this type of misconduct by .08%.

An interaction term, Moral Judgment x External Sanctions, was also added to the model, to examine the hypothesis that rational choice calculations are less important when a situation or potential action is perceived as morally wrong. The interaction term was statistically significant in three of the scenarios (the same three as for External Sanctions alone), *Fabricated Data, False Reporting,* and *IRB Noncompliance*. An examination of the plots for these scenarios demonstrated that the marginal effect of External Sanctions on Probability of Misconduct was the highest when Moral Judgment was not at all wrong and steadily increased to no effect at all when Moral Judgment was very wrong. In Fabricated Data, for example, as shown in Figure 1,the marginal effect ranged from -.04 (*not at all wrong*) to 0 (*very wrong*). This supports the

hypothesis that the potential for External Sanctions may be more of a factor in situations where the individual perceives the action to be taken as morally acceptable to some degree.

DISCUSSION

The purpose of this research was to investigate the phenomenon of academic research misconduct from the perspective of rational choice theory and the Rest, et al., model of moral decision-making. Drawing on a national sample of university sociologists and psychologists, respondent assessments of nine research scenarios were used to examine the likelihood that faculty would engage in these hypothetical misbehaviors and to what extent their perceptions in that regard would be predicted by moral awareness, moral judgments, and expectations of detection and consequences. Analysis of the data showed that field and position were a factor in perceived likelihood of research misconduct in some cases. Field was a consistently small predictor of the perceived likelihood of misconduct, with the sociologists scoring slightly higher than the psychologists in virtually all of the scenarios. In regard to position, the results showed that the perceived likelihood of misconduct was lower for full professors than assistant professors on the authorship-related scenarios, which is consistent with how academia is structured. Senior faculty are under less pressure to get publications out, and first author publications particularly, and they are much less likely to need to please others who might seek a "courtesy" listing as an author on a publication.

Overall, the perceived likelihood of the most serious misbehaviors (Fabrication, Falsification, and Plagiarism) generally was low, and the perceived likelihood of faculty engaging in Questionable Research Practices was quite variable, consistent with prior research in this area.

Moral judgment was shown to be a consistently strong predictor of the perceived likelihood of misconduct across multiple scenarios. Anticipated internal sanctions such as shame and embarrassment were also shown to be a highly consistent factor in the perceived likelihood of misconduct, but perceptions of the likelihood of detection and external sanctions only had direct independent effects in certain scenarios.

It is noteworthy that the two lowest average estimates of Detection for publishers were in the scenarios involving *Authorship to Gain Favor* and *Reneges on Authorshi*p. Researchers may perceive a higher likelihood of detection of such authorship issues by publishers in the future as journals begin to require documentation from all authors on their specific contributions to manuscripts prior to publication. An alternative consideration is that respondents who rate this scenario as not involving a moral dimension may also expect that there would be no concern for publishers to detect. A key finding in regard to Detection is that respondents on average estimated a probability of under 50% that a colleague would detect one of the FFP situations, and the estimated probabilities were even lower for publishers and administrators/review committees. In fact, the perceived probabilities were much lower overall for publishers and administrators to detect misconduct, likely due to the proximity of colleagues. The notable exceptions to this are *Conflict of Interest*, which respondents estimated would be detected by publishers on average about 35% of the time and *IRB noncompliance*, which respondents estimated at an average likelihood of 31.1% for administrators, still fairly low, but higher than any other type of situation for publishers or administrators. In fact, respondents occasionally commented in the survey instrument on the administrator/ committee item, expressing a lack of understanding as to what administrator or research review committee was being referred to in that question. This would

suggest there are few formal administrative or peer research oversight activities in the universities for faculty from psychology and sociology departments, other than the IRB.

Another notable result was the decreasing perceived probabilities of sanctions overall as the sanctions become more severe. In fact, there seemed to be very low perceived probabilities in general of being dismissed from the university or arrest and prosecution for any type of research misconduct. Dismissal was estimated at low probabilities on average even for the FFP situations, although dismissal for fabricating data was estimated at a 28.5% mean likelihood, the highest result.

And finally, it is important to note a very clear pattern with the estimated probabilities for Shame and Embarrassment in comparison to the External Sanctions. The former estimates tended to run much higher for all scenarios than the latter did, suggesting that internal consequences may in fact be much more important in a peer-reviewed research environment than the latter. In keeping with one of the study's key hypotheses, the effects of the rational choice variables were conditioned in some scenarios on moral judgments, whereby the likelihood of misconduct was better predicted by the likelihood of external sanctions when individuals perceived the action as not morally wrong.

The results of this study are largely consistent with previous estimates of the prevalence of research misconduct among faculty (Fanelli, 2009). The likelihood of fabrication and falsification, in particular, were estimated as rare occurrences, while some of the less significant misbehaviors were perceived to be fairly likely. Surprisingly, external sanctions in general were not as important as an independent factor as shown in other research but the interaction effect

between moral judgments and potential sanctions was consistent to some extent with what others have found for corporate crime and academic cheating (Tibbetts, 1997, 1999; Paternoster & Simpson, 1996).

Caution must be exercised in interpreting the results due to several factors. This study measured participant perceptions of the likelihood of misconduct, not actual behavior. The possibility of respondent bias is also present, since this is a sensitive topic, and participants may not be responding with complete honesty, either out of concern for what others might think should they somehow become aware of their responses or simply out of a desire to see themselves as moral persons. Finally, the lack of precision in some of the measures may have led to variability in how participants responded that would not otherwise have been present. It is possible that respondents did not adequately distinguish between what was meant by a moral dimension being present and a moral judgment that an action was wrong. Similarly, the shame and embarrassment items were very crude, and very likely conflated perceptions of the various moral emotions, especially shame, embarrassment, guilt, remorse, or regret.

Even so, the findings from this study have some very interesting implications. For example, education and training efforts on campus that primarily work toward raising awareness of the rules and the consequences for breaking them might be better off shifting to an exploration of the moral issues involved in conducting research. Given the difficulty in monitoring the myriad details involved in research activities, enforcement of such rules and consequences is challenging at best, and thus remain reliant on individual researchers to make good decisions as they proceed through their daily work lives. Scientific norms of disinterestedness and organized skepticism

(Merton, 1942) were grounded in this understanding, but now are being seriously challenged by the pressures to obtain funding and publish interesting results (Anderson, Ronning, De Vries, & Martinson, 2010). Rather than devising new and elaborate methods for detecting misconduct, perhaps focusing on peer support and researchers' passion for doing good science would be more effective in reducing the likelihood of questionable research practices - those types of misconduct that are most prevalent, most difficult to consistently monitor, and most amenable, arguably, to correction. Notwithstanding the current state of higher education and government, the financial challenges and shifting emphasis to business models, accountability, and consumerism, perhaps the most significant enhancement that would improve integrity in research is time–time for faculty to think about their research, reflect on the adequacy and appropriateness of their methods, and communicate with colleagues and mentors about the process as it unfolds.

On the other hand, one area that perhaps does benefit from more of an instrumental approach are those practices that maybe seen as more morally ambiguous, such as those types of IRB noncompliance that are unrelated to study-specific human subjects protections. It was interesting to note how many of the respondents found the IRB scenario to be morally wrong, given the low probability of actual harm to study participants in that scenario (using a consent form approved for one youth sample for another, slightly older one, without informing the IRB). One can speculate how the respondents' perceptions of this scenario might have been affected by the now ubiquitous presence of IRBs on campus, and the role that they play in promoting an overall system of research integrity, such that any violations of IRB requirements may seem morally wrong. Regardless, this study would suggest that most researchers who are aware of the moral implications of their interactions with study participants may be likely to do the right thing on

their own without concern for sanctions. But for those who do not perceive every IRB requirement as a moral imperative, the results suggest that an expectation of detection and sanctions might then play a role in preventing rule-breaking. In this sense, post-approval monitoring systems, or other mechanisms for increasing the perception of detection and sanctions for misbehavior, can be useful in maintaining an efficient system of rule-following as well as catching the bad apples that may cause real harm to participants.

Additional research must be undertaken to fully understand the interaction between moral and rational factors in decision-making. Future studies should broaden the sample to include other fields and better measure emotional states and possibly other "internal" sanctions. In addition, analyses are needed that can aggregate the data across scenarios, to better answer questions comparing FFP versus QRP misconduct. Finally, a valuable adjustment to this study design would be to integrate environmental variables that have shown promise in previous studies, including perceptions of distributive justice, observation of misconduct in the past, and mentoring and peer support.

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Appendix

Scenarios/Vignettes from the Research Instrument

SCENARIO 1. Dr. Cedar, a young developmental psychologist, obtained an R01 Research Grant from the National Institute of Child Health and Human Development to study aggression in elementary school children. Cedar suspects that some children with a certain genetic makeup will be especially susceptible to the effects of television violence. Part of the project requires obtaining a cheek swab for DNA analysis, but interviewing and observing children in the classroom constitutes the major effort. Cedar is anxious to get results from this study published as soon as possible to support an upcoming tenure review.

ITEM 1A. *After collecting data for one semester, Dr. Cedar becomes concerned that the preliminary results from the study are not promising and decides to expand the sample population to include adolescents. Cedar feels frustrated, however, that the study may require additional IRB review due to the change in sample, and therefore decides to proceed using the consent documents already approved for the younger children without bringing the sample change to the attention of the IRB.*

ITEM 1B. *In the spring, Dr. Cedar begins analysis of the results from the adolescent sample and finds that the pattern largely supports the expected findings. During the analysis, however, Cedar spots an anomaly in the data and after talking to the research assistants, believes an error occurred in the way the results were recorded during the third observation for each participant. It is not possible to repeat the observations as the third in the sequence and in any case*

additional observations for the entire sample would take too much time. Throwing those observations out, however, renders all of the results non-significant. Cedar decides to create scores for the third observations, using his best guess as to what they would have been had they been carried out correctly, and then use those data in the analysis. The results are now largely significant and Cedar proceeds to draft the initial article.

ITEM 1C. *Cedar's graduate students are currently writing manuscripts for projects they completed as extensions of the primary study. Cedar has already implied that the graduate students will be first authors on their respective projects, but reconsiders, given the pressure for additional first-author publications for the upcoming review. Cedar decides to remain as first author and list the graduate students as second and subsequent authors.*

SCENARIO 2. Dr. Daniels has earned substantial prestige as a young researcher in the field of behavioral economics. Daniels' program of research is focused on the future discounting of delayed benefits. Currently Daniels is studying the effects of self-payment for end-of-semester grades in high school students. Students are to be given 0, 15, or 30 dollars to use now in any way they like, or to deposit in a "lock box" to be redeemed only after receiving a "B" or better in their required geometry course. Daniels is hoping to be ready for tenure review next year.

ITEM 2A. *Along with a consent form, Daniels has sent a brief description of the study home with students. When the forms are returned, although signed, a few contain notes from the parents saying that they agree only if their child is included in one of the monetary groups, but not if their child is in the no-payment group. Even more of the students' assent agreements carry this stipulation. Daniels needs all the subjects possible, and so decides to satisfy as many*

requests as possible, and try to make up the difference at the next school, where hopefully the problem can be lessened.

ITEM 2B. *Daniels has nearly finished the study and an initial report of the hypotheses and results is being prepared for the funder. Daniels' graduate student, Lauren, has been assigned the job of developing the first draft of the results section. Daniels instructs Lauren to gloss over the striking SES and ethnicity results that were found, because they might be interpreted as greed and impulsivity. Lauren, on the other hand, maintains that a full account of the key findings should be given. Daniels explains to Lauren that the main experimental question was about incentive effects, and that is all she should describe, leaving out the interactions with class and money.*

ITEM 2C. *Daniels has been hard at work writing up the high school lock-box data, and it occurs to him that the results are more than strong enough to merit a neuro-economic analysis of the effect. It could show how his manipulation might reshape a student's fMRI index of future academic performance and, by implication, the change in his or her subjective economic value. A second phase of the study was therefore initiated, in which serial fMRIs scans were taken while new student participants were asked to make their lock-box decisions. Daniels watched as the first round of images appeared, and nothing looked especially promising. Brain metabolic activity seemed more or less uniformly distributed across all conditions. Daniels' post-doc noted, however, that new digital technology would allow them to adjust the images a bit to ensure the results appeared more interesting. Daniels is concerned the funding support for his*

research will dry up if he does not continue to produce results, and so agrees provided the adjustments are minor and cannot easily be detected.

SCENARIO 3. Dr. Channing is a young American anthropologist studying agricultural practices of the Mofu people of Cameroon, Africa. Due to the demanding nature of this project, which requires frequent travel to Cameroon and lengthy periods of data collection, Channing has not published any of the findings yet, although one paper is under review. The delay has been unavoidable, but tenure review is only a year away, so the pressure to publish from this project is building.

ITEM 3A. *Channing has hurried to prepare a manuscript for publication. A collaborator phones to say that a senior department member, Dr. Foster, has been hinting that he should be listed as a co-author. The collaborator points out a few advantages of including him. Although Foster did not directly contribute to the study design, he did provide useful advice regarding data analysis. Channing sees that including him as an author might increase the paper's prestige, and thus decides to go ahead and include Foster last in the list of authors; it costs nothing, and can only add prestige and promote good relations with Foster—something needed for the upcoming tenure review.*

ITEM 3B. *The paper is accepted pending minor revisions and Wilson, one of Channing's graduate students, reanalyzes data from the Mofu project for his Master's thesis. The student*

finds that in Channing's haste to get the data analyzed, some of the agricultural plots were omitted. When included, the important differences are reduced to marginal significance. The pressure to get the paper out is now overwhelming, and so Channing decides to keep the results section as is, but emphasize in a revision that the readers should be cautious about interpretations because more work on this topic is needed.

ITEM 3C. *Channing is collaborating with a senior researcher on a grant proposal to the International Fund for Agricultural Development (IFAD). She notices that a consulting agreement with an agricultural manufacturer is not disclosed in his draft of the application. She guesses that disclosing this fact might compromise approval by IFAD and supposes that the principal investigator (PI), who knows the ins and outs of the application process, may have purposefully omitted the information. Channing is hesitant to question her collaborator about this potentially sensitive subject, and finally decides to proofread and modify technical details of the proposal as needed, but respect the PI's decision about listing his ties to industry.*

FIGURE 1 Conditional effects of external sanctions on perceived likelihood of misconduct in the *Fabrication of Data* scenario.

Regression Model (with interaction term Moral Judgment x External Sanctions) is plotted for the scenario *Fabrication of Data*, including the confidence interval for statistical significance.

Marginal Effect of X (External Sanctions) on Y (Misconduct) As Z (Judgment) Changes

Dependent Variable: Misconduct

TABLE 1

Probability of Misconduct by Discipline

Scenario	All Respondents				Psychology				Sociology				diff.	t
	M	n	Min	Max	M	n	Min	Max	M	n	Min	Max		
Fabricated Data	3.5	468	0	100	1.7	235	0	100	5.4	199	0	100	-3.7	-3.01**
Adjusted Images	6.2	434	0	100	5.3	222	0	80	7.2	191	0	100	-1.9	-1.18
False Reporting	9.4	482	0	100	7.7	243	0	75	11.8	207	0	100	-4.1	-2.56*
IRB Noncompliance	8.7	476	0	100	7.2	227	0	100	11.3	207	0	100	-4.1	-2.08*
Reneges on Authorship	9.4	474	0	100	9.5	242	0	80	9.6	204	0	100	-0.2	-0.11
Parents Dictate Study Groups	11.0	421	0	100	8.2	207	0	100	14.8	185	0	100	-6.6	-2.98**
Adjusted Reporting	14.0	455	0	100	14.4	234	0	95	13.1	196	0	100	1.3	0.58
Authorship to Gain Favor	39.1	451	0	100	41.0	221	0	100	37.3	200	0	100	3.7	1.26

Conflict of Interest	17.5466	0	100	15.2237	0	90	20.6205	0	100	-5.4 -2.31*

*p≤.05. **p≤.01. ***p≤.001.

TABLE 2

Disciplinary Differences in Moral Dimension and Moral Judgment

Scenario	Moral Dimension							Moral Judgment						
	Respondents Choosing 4 or 5 (Clearly Present)							Respondents Choosing 4 or 5 (Wrong or Very Wrong)						
	All		Psychology		Sociology			All		Psychology		Sociology		
	%	n	%	n	%	n	diff	z	%	n	%	n	%	n	diff	z
Fabricated Data	95.3	446	96.6	227	93.5	186	3.1	1.5	93.8	439	95.3	224	92.5	184	2.8	1.2
Adjusted Images	88.0	382	86.9	193	89.0	170	-2.1	-0.6	87.9	381	86.9	193	88.5	169	-1.6	-0.5
False Reporting	88.8	428	90.5	220	88.4	183	2.1	0.7	85.3	411	87.6	213	83.1	172	4.5	1.4
IRB Noncompliance	64.9	309	61.7	140	66.7	138	-5.0	-1.1	64.1	305	62.6	142	66.2	137	-3.6	-0.8
Reneges on Authorship	82.7	392	78.5	190	87.3	178	-8.8	-2.4*	78.3	371	74.4	160	83.3	170	-8.9	-2.3*
Parents Dictate Study Groups	60.3	254	59.9	124	60.5	112	-0.6	-0.1	62.2	262	62.8	130	59.5	110	3.3	0.7

Adjusted Reporting	59.82	72	58.1	136	60.7	119	-2.6	-0.5	54.52	48	53.4	125	54.6	107	-1.2	-0.2
Authorship to Gain Favor	40.11	81	36.7	81	43.0	86	-6.3	-1.3	20.2	91	16.7	37	22.0	44	-5.3	-1.4
Conflict of Interest	85.03	96	86.5	205	82.9	170	3.6	1.0	77.73	62	78.9	187	75.1	154	3.8	0.9

*p<.05.

TABLE 3

Perceived Likelihood of Detection of Misconduct

Scenario	Colleague		Publisher		Administrator		
	M	S.D.	M	S.D.	M	S.D.	**n**
Fabricated Data	31.9	30.3	18.3	24.5	15.7	23.2	468
Adjusted Images	39.0	30.3	23.6	27.0	15.6	22.3	434
False Reporting	46.4	32.2	18.8	23.4	13.1	19.9	482
IRB Noncompliance	35.9	31.7	15.4	23.5	31.1	30.3	476

Reneges on Authorship	69.1	28.8	12.8	19.6	14.9	21.7	474
Parents Dictate Study Groups	28.2	30.8	21.5	31.1	13.7	22.6	421
Adjusted Reporting	43.5	32.4	27.4	29.8	14.0	22.2	455
Authorship to Gain Favor	57.5	33.5	15.0	25.7	12.3	22.6	451
Conflict of Interest	31.1	31.1	35.0	29.4	22.6	25.5	466

TABLE 4

Perceived Likelihood of Sanctions for Misconduct

Scenario	Shame		Embarrassment		Censure in file		Censure by committee		Sanctioned from research		Dismissal		Criminal arrest		n
	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
Fabricated Data	91.0	22.4	89.7	23.0	62.9	36.6	62.9	37.4	45.8	37.8	28.4	32.1	5.2	14.1	468
Adjusted Images	84.5	27.3	81.6	29.6	41.6	36.1	43.5	37.1	28.2	33.1	15.3	24.3	2.6	9.6	434
False Reporting	83.7	26.9	78.9	30.0	33.0	33.1	30.0	32.2	15.7	25.9	8.8	17.6	1.4	6.8	482
IRB Noncompliance	70.5	35.0	67.3	34.8	41.3	35.6	58.6	35.6	34.6	33.4	8.8	17.5	2.1	6.9	476
Reneges on Authorship	75.7	30.0	68.1	33.6	14.5	22.4	11.1	20.3	3.8	13.0	1.5	6.2	0.3	1.7	474
Parents Dictate Study Groups	70.0	35.7	67.0	36.4	25.4	31.2	30.0	33.9	15.2	24.9	5.8	15.2	0.8	4.5	421
Adjusted Reporting	58.1	38.1	55.3	38.2	14.2	24.5	14.4	25.3	6.7	17.8	2.7	9.7	0.4	3.3	455

Authorship to Gain Favor	29.3	32.0	26.6	31.3	4.6	12.4	4.5	12.5	1.4	6.2	0.7	4.2	0.1	0.4	451
Conflict of Interest	63.2	33.9	55.7	35.9	22.1	29.4	25.7	31.2	11.9	22.6	5.4	14.2	1.8	8.2	466

TABLE 5

Estimates of Perceived Probability of Misconduct

Variable	FFP Scenarios			QRP Scenarios					
	Fabricated Data	Adjusted Images	False Reporting	IRB Non-compliance	Reneges on Authorship	Parents Dictate Study Groups	Adjusted Reporting	Authorship to Gain Favor	Conflict of Interest
Constant	43.32	55.68	60.41	39.92	46.71	45.00	43.08	79.95	79.32
Moral Judgment	-8.19**	10.88**	-8.73**	-7.03**	-7.00**	5.78**	-7.66**	-11.86**	-14.92**
Detection	0.04	0.02	0.02	0.09	0.09*	0.01	0.02	-0.07	-0.01
Internal Sanctions	-0.09*	-0.08*	-0.16**	0.14**	0.15**	-0.23**	-0.17**	-0.15*	0.07

External Sanctions	-0.50**	-0.40	-0.64*	-0.39**	0.68	-0.24	-0.22	1.18	-0.43

(Table, continued)

Moral Judgment x External Sanctions	0.10**	0.09	0.13*	0.09*	-0.14	0.07	0.09	-0.23	0.10
Sociology	3.10*	3.09*	3.37*	5.21**	3.65*	5.98**	0.08	-2.63	6.00**
Associate Professor	-0.49	0.41	1.58	-6.37*	-3.27	-1.12	3.85	-4.91	1.29
Full Professor	-0.75	-0.38	-4.86**	-2.01	-4.25*	-0.28	0.68	-8.87**	-1.28
Administrator	2.86	2.13	4.63	-2.42	-3.99	-1.06	7.62	-15.40	-1.48
Non TT Faculty	-2.82	-3.49	-5.26	-3.56	-4.81	-4.01	4.47	-9.23	-2.54
Other Position				7.73	-2.75			1.45	5.61

	4.58	1.78	8.01			11.05	3.31		
Male	1.19	1.78	0.24	4.16 *	2.49	0.68	2.17	-1.30	0.89
Black	3.73	1.83	6.58*	-1.04	2.58	5.44	1.21	-3.78	-3.97
Hispanic	0.63	3.56	-5.04	1.62	-2.31	-4.23	5.71	-2.00	1.42
Asian	0.26	1.84	15.58 **	9.22	8.68	1.74	9.87	-1.14	17.73 *
Other	2.18	16.74	10.82	3.89	6.04	-3.68	-3.10	16.65	39.84 *
% Time Spent in Research	0.08 **	0.03	0.02	0.06	-0.02	-0.02	0.09	-0.02	0.02
Adj. R^2	0.22	0.39	0.39	0.21	0.32	0.34	0.36	0.30	0.39

*p<.05. **p<.01. ***p<.001.