11-10-2017

What's It To Me? Self-Interest and Evaluations of Financial Conflicts of Interest

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Original Article: Empirical

Research Ethics
2018, Vol. 14(4) 1–17

DOI: 10.1177/1747016117739940
journals.sagepub.com/home/rea

What's it to me? Self-interest and evaluations of financial conflicts of interest

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Abstract

Disclosure has become the preferred way of addressing the threat to researcher objectivity arising from financial conflicts of interest (FCOIs). This article argues that the effectiveness of disclosure at protecting science from the corrupting effects of FCOIs—particularly the kind of disclosure mandated by US federal granting agencies—is more limited than is generally acknowledged. Current NIH and NSF regulations require disclosed FCOIs to be reviewed, evaluated, and managed by officials at researchers' home institutions. However, these reviewers are likely to have institutional and personal interests of their own that may undermine the integrity of their evaluations. This paper presents experimental findings suggesting that such interests affect third-party assessments of FCOIs. Over 200 participants gauged the ethical significance of various hypothetical yet realistic FCOIs in academic research settings. Some of them were led to believe they had a small personal interest in allowing conflicted research to proceed, whereas others' personal outcomes were unrelated to the conflicted research. The results show that motivated reasoning influences FCOI evaluations, such that those with personal interest in conflicted research provided more lenient evaluations of researcher FCOIs. These findings imply that the capacity of federally mandated FCOI disclosure procedures to enhance bias-free science is quite restricted.

Keywords

conflicts of interest, research ethics, disclosure, self-interest, objectivity

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Introduction

For some time, regulators, policy-makers, and ordinary citizens alike have been concerned about real and perceived threats to science posed by researchers' financial conflicts of interest (FCOIs). These concerns have been heightened both by well-publicized recent scandals and by a growing number of collaborations between academic scientists and for-profit entities ranging from small partnerships and start-ups to pharmaceutical corporations. As is true in professional domains such as financial services, real estate, and medical practice, disclosure has become the preferred way of addressing risks to integrity posed by researchers' FCOIs (Ben-Shahar and Schneider, 2014; Loewenstein et al., 2011). FCOI disclosure is now required by most academic journals, granting agencies, and academic institutions, and it is advocated by most disciplinary codes of ethics and other advisory documents. In 2011, the US Public Health Service (PHS) tightened disclosure mandates for funded scientists.

There is much to be said for disclosure as a primary response to the problem of FCOIs. For one thing, disclosure is less restrictive than outright bans on conflicted relationships, reapportionments of research tasks, or other more intrusive approaches. Typically, disclosure allows conflicted projects to proceed as planned. This serves the interests of both science and society generally, since less academic research would be completed without private sector funding and the conflicted relationships it often engenders (Resnik, 2010). Industrial support also benefits those who are involved in the work. It helps researchers develop promising ideas, provides support for student assistants, and may produce valuable intellectual property for researchers' institutions. Furthermore, disclosure respects individuals' autonomy in that it allows both researchers and other affected parties to "decide for themselves." Such latitude reconciles the importance of clear policies with the fact that case-by-case, FCOIs vary considerably relative to the specific relationships involved, the nature of the research, and other details. Disclosure also is easily accomplished and cost free.

Whether it adequately addresses risks to integrity induced by researchers' financial interests can be questioned, however. While some limitations and drawbacks of disclosure, both inside and outside academic science, have been well documented (Elliott, 2008; Loewenstein et al., 2011; Resnik and Elliott, 2013), the purpose of this article is to highlight a neglected facet of disclosure's effectiveness: the likelihood that those who review others' FCOI disclosures will be influenced by their own motivations. We present results of an experimental study suggesting that in contexts modeling those found in PHS and National Science Foundation (NSF) regulations, reviewers' assessments tend to be influenced either by their own interests or those of their institutions. Assuming these same effects occur also in "real world" reviews—as one would expect that they would—they

reveal a specific pathway through which conflicts of interest may corrupt assessments of research integrity. In both cases, motivated reasoning undermines, or at least threatens, professional integrity, limiting the effectiveness of third-party disclosure assessment as a means of ensuring scientists' objectivity.

We begin by briefly summarizing relevant literature and the procedures mandated by current US PHS and NSF disclosure policies. Next, experimental evidence of the potential influence of self-interest on disclosure reviewers is presented, evidence based on research participant evaluations of a range of fictional but realistic and research-related scenarios. As hypothesized, reviewers' own perceived direct or indirect interests affect their judgments about academics' disclosed FCOIs. In conclusion, the implications of these results for FCOI disclosure policy more generally are discussed. Our main point is not that disclosure is ill-advised; certainly, it is an aspect of openness and transparency. The point, rather, is that by itself, disclosure does less to address the problem of FCOI-related objectivity than is often hoped for or presumed.

Background

Though FCOIs in scientific research have existed almost long as science itself, concerns about academic researchers' FCOIs have grown over the past several decades. In the US, the Bayh–Dole Act of 1980, together with the Federal Technology Transfer Act of 1986 and other subsequent legislation and executive orders (Eisenberg, 1996), have facilitated funding relationships between academic researchers, their institutions, and industry, and these relationships have become progressively more numerous and complex over the past three decades (Kleinman, 2010; Krimsky, 2010). Collaborations also have been spurred by declining government funding for public education and research—which universities have tried to address partly with private research contracts (Prasad and Cifu, 2015)—and by increased demands that universities become engines for economic development (Bok, 2003). Meanwhile, the public has become increasingly aware of misdeeds by academic scientists with FCOIs. Prominent recent examples include collusion between researchers and the sugar industry in nutrition studies (O'Connor, 2016), reports on the uses and safety of blockbuster drugs Vioxx and Paxil (Brophy, 2016; Jureidini et al., 2008), and publications downplaying the risks of both global warming and fracking written by academics with ties to the oil and gas industry (Giles and Scwartz, 2015; Siegel et al., 2015).

Such examples fuel suspicions that when researchers' personal financial interests bear significantly and directly on their work, impartial science is likely to suffer. Though commonly discussed in terms of a "bias," the bias metaphor is at least potentially misleading in this context (Davis, 2012). "Bias" connotes a systematic tilt, as is found in an incorrectly calibrated scale. While individuals can

suffer from such consistent distortions, the corrupting effects of FCOIs in academic research more typically arise in situation-specific and less predictable ways. In part, this is because academics' financial relationships with industrial sponsors can take many forms: salary, stock, equity or stock options, consulting fees, honoraria, cash awards, travel, and intellectual property, including patents and copyrights. Also, financial interests can consciously or unconsciously influence decision making at any number of points in the scientific process: problem selection, hypothesis formulation, research design, sample selection, data collection, data analysis and interpretation, and dissemination of findings. These complexities make the problem of FCOIs in academic research resistant to a mechanical, "one-size-fits-all" solution.

Of course, the mere fact that a scientist has a financial stake in his or her work does not automatically entail lost objectivity. Nevertheless, considerable evidence exists that financial interests can and often do influence research in both subtle and not-so-subtle ways. Data analyses readily can be misleadingly subverted or distorted (Fava, 2016; Jane-wit et al., 2010; Page et al., 2013; Resnik, 2010). "Significance chasing" or "*p*-hacking"—presenting statistically significant yet unhypothesized findings as having been predicted from the start—can lead to the proliferation of Type 1 errors. A version of this technique was used by GlaxoSmithKline as part of its deceptive marketing of Paxil (Belluz, 2015). "Design bias," resulting from use of inappropriate controls, selective inclusion of variables, flawed sampling, or under-powered methodologies, is a notable concern (Fugh-Berman, 2013; Irwin, 2009; Sismondo, 2008). It was a factor, for example, in the misleading recent hyping of Tamiflu by Roche (Prasad and Cifu, 2015). There is widespread evidence of the non-publication of negative results, commonly referred to as the "file-drawer" problem (Fanelli, 2012), influencing for example the perceived efficacy of antidepressants (Turner et al., 2008). Sometimes, fine-grained discrepancies exist between research findings and what is ultimately reported (Vera-Badillo et al., 2013). A recent analysis found that compared with studies not sponsored by industry, industry-sponsored studies of drugs and medical devices are more likely to report positive and beneficial findings and less likely to show agreement between the article's conclusion and its reported results (Lundh et al., 2017). The fact that so many of these problems have occurred in medical and pharmaceutical research simply reflects the fact that, at present, this where the financial stakes are highest.

Some recent commentators have argued that concerns about scientists' FCOIs are exaggerated, either on grounds that the recommended cures are worse than the disease or because such worries are caused by knee-jerk emotional reactions more than hard data (Allison, 2009; Rosenbaum, 2015a, 2015b). Others object that such concerns unjustly malign researchers with financial interests, since typical career pressures and other personal interests can affect research objectivity too (Resnik,

2007), or that the focus on FCOIs sows too much distrust (Johnsson et al., 2014). However, these sorts of broad dismissals are increasing rare, particularly given accumulating evidence of how unreliable much recent scientific work is proving to be (Ioannidis, 2005, 2012). Concerns about FCOIs are also sometimes dismissed too quickly as a problem only for a "few bad apples" (Cain and Detsky, 2008). However, conflicts of interest produce motivated reasoning—reasoning geared towards reaching a desired conclusion—for most people and in a great variety of circumstances (Mazar and Ariely, 2015). Doctors, for instance, long believed themselves immune to influence resulting from trivial gifts from pharmaceutical companies. The evidence is abundantly clear, however, that even small favors and incentives affect their behavior (Brody, 2007; Dana and Loewenstein, 2003). Despite this, most researchers continue to believe that they are largely unaffected by conflicts of interest and that mere disclosure of them is ethically sufficient (Mecca et al., 2015).

On the face of it, disclosure might mitigate diminished objectivity in two ways. First, by increasing transparency, it could help journal editors, peer reviews, and other researchers accurately interpret and evaluate research aims, methods, and findings, in part by ratcheting up skepticism about findings and conclusions in conflicted reports. Second, it could make researchers less likely to enter into conflict-producing relationships in the first place, preferring simply to avoid possible doubts about the integrity of their work. A third and distinct possibility is that disclosure might help assuage broader social concerns about research integrity by signaling that measures are in place to guard against corruption. The difference between the first two and the third corresponds to a distinction Ziman draws between "cognitive objectivity," which involves the physical reality science endeavors to understand, and its "social objectivity," which depends on the public's confidence in science's credibility (Ziman, 2003).

These potential benefits have spurred a strong impetus towards FCOI disclosure, beginning in the mid-1980s. Two leading academic medical journals adopted disclosure requirements at that time (Krimsky, 2010), and in 1995 both the Department of Health and Human Services (DHHS) and the NSF began requiring universities to document and manage FCOIs. The expressed purpose of these virtually identical regulations was to "establish standards and procedures to be followed by institutions" to promote "objectivity" by ensuring that funded research "will not be biased by any conflicting financial interest of those investigators responsible for the research" (DHHS, 1995; NSF, 1995). During the early 2000s, surveys of science and medical journals showed a rapid growth in disclosure requirements (Krimsky, 2010), and scientists overwhelmingly prefer or strongly prefer disclosure to more intrusive approaches (Lockhart et al., 2013; Weinfurt et al., 2006). In 2011, revised DHHS regulations covering all PHS funding, including National Institutes of Health (NIH) research grants, were put in place (DHHS, 2011).

The key features of the current PHS regulations are worth summarizing, given their pertinence to the findings provided below. Funded investigators must regularly disclose several kinds of "significant financial interests" (SFIs) related to their "institutional obligations" to officials at their academic institutions. The 2011 revisions lowered SFI thresholds: researchers now must reveal any equity interests in non-publically traded entities, any intellectual property rights, corporately funded travel, and equity stakes worth $5000 or more in publically traded entities. However, primary onus for collecting, reviewing, and "managing" researchers' disclosed conflicts lies with the institutions. Crucially, institutions must determine which if any researcher SFIs constitute bona fide "financial conflicts of interest," that is, financial interests "that could directly and significantly affect the design, conduct, or reporting of the NIH-funded research" (DHHS 2011). If so, the institution must develop and put in place adequate safeguards and complete retrospective reviews and mitigation reports in the case of researcher non-compliance. Overall, the regulations largely defer to institutions to judge the seriousness of the threat posed by disclosed conflicts, and institutions also are responsible for making researchers' disclosures publicly accessible, such as through a university-maintained website. NSF policy on FCOI disclosure varies in some details, but the underlying mechanisms for enhancing research objectivity are largely the same. In both cases, institutions are obligated to police themselves.

How much these regulations do to promote objectivity, their declared purpose, is not clear. Consider first the goal of encouraging better researcher behavior. While mandatory disclosure sometimes leads people to avoid conflicts, conflict avoidance is a function of how avoidable the conflicts are (Sah and Loewenstein, 2014). In many academic research contexts, projects simply would be impossible without industrial involvement. Also, mandatory disclosure has been shown to encourage worse behavior. So-called "moral licensing" occurs because having fulfilled their disclosure obligations, individuals sometimes take ethical liberties elsewhere (Cain et al., 2011; Effron and Conway, 2015). In effect, disclosure enables conflicted individuals to displace their ethical responsibilities onto others' shoulders, having already supplied evidence of their own moral credentials (Brown et al., 2011). In addition, compared with physicians or financial advisors, researchers are especially susceptible to the "identifiability effect" (Sah, 2012). People are less conscientious regarding their conflicts of interest when they perceive greater psychological distance from those who might be adversely affected by their actions. Obviously, researchers are often far removed from those most likely to suffer from their flawed work.

Neither is disclosure likely to be as useful to reviewers as one might suppose. Findings from other professional domains are instructive. Research regarding FCOI disclosures by physicians finds that while transparency makes some patients trust them less, it makes others trust physicians more (Weinfurt et al., 2008),

presumably because it is taken as a sign of their trustworthiness. Another study showed that while medical journal peer reviewers reported increased general skepticism about conflicted research, ultimately their assessments of individual manuscripts were usually unchanged by disclosure (Lippert et al., 2011). Similarly, a study of the likelihood of prescribing a drug based on the results of a hypothetical trial concluded that FCOI disclosures had little impact on physician's self-reported behavior. While disclosures induced skepticism towards conflicted research when directly compared with non-conflicted work, this skepticism was not produced by conflicted research evaluated in isolation (Silverman et al., 2010). Consider also substantial evidence documenting the poor reliability of peer review in general. Studies have shown low inter-rater reliability, whether reviewers are evaluating journal manuscripts (Bornmann et al., 2010) or grant applications (Marsh et al., 2008; Mutz et al., 2012), particularly when reported findings are contrary to the reviewer's theoretical perspective (Mahoney, 1977).

In fact, two factors make discerning, objective review of researchers' FCOI disclosures difficult. The first, alluded to above, is the awkwardness of outsider review of research (Sax and Doran, 2011). Administrative officials, even those with a background in science, may lack the specific disciplinary expertise needed to question a specialists' judgment. Researchers from nearby areas of inquiry at the same institution likewise may feel uncomfortable appearing to doubt a peer's approach. Not wanting to appear distrustful, it is easier simply to defer. In other contexts, disclosure has been demonstrated to produce compliance with conflicted advice (Sah et al., 2013).

The second problem, arguably more insidious and pervasive than the first, is motivated reasoning. Much as a scientist with a financial conflict of interest in the work has two competing motivations, a similar dynamic faces those who must review disclosures from researchers at their institutions. Allowing the work to proceed with minimal interference will in many cases best serve the interests of the institution and will please those who want the work to proceed. Reasons for caution, on the other hand, often will be cognitively indeterminate and ethically malleable. Situations such as this enable people to act as "motivated Bayesians," doing what serves their interests while acting conscientiously enough to feel good about their own ethicality (Gino et al., 2016). After all, switching back-and-forth between dual roles is cognitively difficult (Moore et al., 2010); it is hard to be an impartial and neutral practitioner in one respect while being partisan advocate in another. People typically believe they are being objective, but what they desire to be true shapes their interpretation of scientific evidence even more than their initial beliefs (Bastardi et al., 2011).

Once again, analogous circumstances to FCOI disclosure evaluation provide plentiful supporting evidence. As Saver has argued persuasively regarding Institutional Review Boards (IRBs), the pressure to conform ethical evaluations to

social and institutional pressures can be difficult to resist, particularly when few incentives favor skepticism (Saver, 2004). Also, in evaluating conflict of interest policies, physicians viewed proposed conflict of interest policies in medical settings more critically and less favorably than nearly identical policies applied to financial investments; the attitudes of financial planners were the reverse. Professionals' biases tend to mirror those of the institutions they serve (Sharek et al., 2008: 377). So too for lawyers, who are swayed by their own financial interests when advising clients (Moore et al., 2005). External auditors hired to evaluate the integrity of corporations' book-keeping tend to shade to their audits; those they audit pay for their work (Moore et al., 2006). Likewise, corporate boards often are reluctant to check CEOs' FCOIs aggressively (Lin, 1996). As noted above, such influences often operate without conscious awareness of those affected by them and without intentional compromise of their judgment (Chugh, 2005). Those benefited by their skewed judgment tend to be close-by and familiar, while those potentially hurt by it are unknown and remote.

All of these strands of evidence suggest that that neutral evaluation of others' disclosed FCOIs is not easy, and that the sort of institutionally based third-party review mandated by federal granting agencies is likely to be affected by motivated reasoning. The next section presents experimental evidence in support of this conclusion.

Methodology

Materials and procedure

After first securing IRB approval, study participation was solicited though the university's online experiment portal (SONA Research Systems). In total, 229 undergraduate students volunteered in exchange for partial course credit (189 women, 37 men, three undisclosed gender; Mean age: 21.41 years, $SD = 5.50$ years). After giving informed consent, participants read a standard definition of financial conflict of interest:

> A financial conflict of interest is a situation in which someone's work-related obligations or professional responsibilities potentially conflict with his or her personal financial interests. Financial conflicts of interest raise questions about possible bias, and they can exist even when no one has done anything wrong.

To simulate the self-interest of institutional FCOI reviewers, study participants then were given a fictional statement about a new federal initiative. The statement claimed that states were to begin receiving fixed-sum supplements to academic research funding already received at their institutions from federal grants or private industry sponsors (see Appendix). Ultimately, supplemental funds were to be

distributed to funded scientists and to students in the form of tuition rebates, but the total disbursable share available at each institution depended on the portion of the state's research dollars garnered by members of that institution's faculty. Research funds received by researchers at one institution increased the supplemental share available to that institution's researchers and students and reduced the amount available to the rest of the state. The ruse was designed to encourage participants to think they could benefit in a small yet direct way by allowing conflicted research at their institution to proceed.

Participants then assessed 10 scenarios presented in randomized order in which academic researchers from various disciplines had FCOIs (see Appendix). They were randomly assigned to one of four conditions on a between-participants basis: 2 (disclosure, non-disclosure) × 2 (own university, competitor university). Each scenario involved a researcher who either did or did not appropriately disclose an FCOI and was from either the participants' home university or an in-state competitor. Participants then were asked to answer four questions about each vignette, the first three, presented in randomized order, using Likert scales: "To what extent is this situation a financial conflict of interest (1 = *not at all a financial conflict of interest*; 7 = *very much a financial conflict of interest*)?" "To what extent is this situation unethical (1 = *not at all unethical*; 7 = *very much unethical*)?" "To what extent is this situation likely to affect the researcher's objectivity (1 = *not at all likely*; 7 = *very likely*)?" In the fourth question, participants were asked what the researcher in each situation should do: Continue the research activity AND continue the financial relationship with the external entity; End the relationship with the external entity BUT continue the research activity; or Discontinue the research activity BUT continue financial relationship with external entity. Importantly, the first option would provide the most favorable outcome not only for the researcher, but also for the third party (i.e., participants) should they provide a favorable evaluation of the potential researcher FCOI, specifically when that research was to be conducted at the participants' own institution.

After assessing the scenarios, participants provided brief demographic information (e.g., age, gender) and were redirected to an online debriefing form.

Results

Perceptions of FCOI, ethicality, and objectivity based on affiliation and disclosure

Because FCOI ($\alpha = .83$), ethicality ($\alpha = .81$), and objectivity ($\alpha = .82$) perceptions were reliable across scenarios, we averaged participants' responses to create a composite of perceptions of FCOIs, ethicality, and objectivity, where higher scores reflect greater perceptions that the situations represented a significant FCOI, would

be of greater ethical concern, and would be a greater threat to researcher objectivity, respectively. We then conducted three separate 2 disclosure (disclosure, non-disclosure) × 2 affiliation (own university, competitor universities) between-subjects ANOVAs for perceptions of FCOI, ethicality, and objectivity, respectively.

For FCOI perceptions, the only significant effect to emerge was a main effect of disclosure, $F(1,225) = 10.51$, $p = .001$, $\eta_p^2 = .045$, such that participants in the non-disclosure condition indicated that the situations were more of an FCOI ($M = 4.54$, $SD = 1.21$) than participants in the disclosure condition ($M = 4.04$, $SD = 1.10$). There was no main effect of researchers' institutional affiliations, nor an interaction between affiliation and disclosure (ps > .68).

Regarding ethicality of the situations themselves, again the only significant effect to emerge was a main effect of disclosure, $F(1,225) = 19.74$, $p < .001$, $\eta_p^2 = .081$, such that participants in the non-disclosure condition indicated that the situations were more unethical ($M = 4.45$, $SD = 1.14$) than participants in the disclosure condition ($M = 3.83$, $SD = .95$). There was no main effect of researchers' institutional affiliations, nor an interaction between affiliation and disclosure (ps > .36).

For assessments of whether the researchers' objectivity was likely to be affected, the only significant effect to emerge was a main effect of disclosure, $F(1,225) = 10.85$, $p = .001$, $\eta_p^2 = .046$, such that participants in the non-disclosure condition indicated that the situation was more likely to affect ethicality ($M = 4.66$, $SD = 1.09$) than participants in the disclosure condition ($M = 4.20$, $SD = 1.01$). There was no main effect of researchers' institutional affiliations, nor an interaction between affiliation and disclosure (ps > .22).

Thus, regardless of whether the researcher was affiliated with one's own institution or not, participants reported that researchers with undisclosed rather than disclosed financial relationships had more of an FCOI, were in less ethical situations, and a situation more likely to affect the researchers' objectivity.

Decisions regarding researcher conduct

In order to determine if there were differences in participants' recommendations as to what the researchers should do, we divided the frequency with which participants made each type of decision and divided that by the total number of scenarios. This yielded a percentage for each decision type, ranging from 0% to 100%. We then conducted a 2 affiliation (participants' university, competitor university) × 2 disclosure (FCOI disclosed, FCOI undisclosed) × 3 decision (continue both, continue research only, continue financial relationship only) mixed-model ANOVA, with repeated measures over the last factor. This analysis yielded a main effect of decision, $F(2,450) = 45.96$, $p < .001$, $\eta_p^2 = .170$; post hoc tests revealed that to an equal degree, participants thought that the researcher should continue both the research and the financial relationship ($M = .40$, $SD = .22$) or continue the research

only ($M = .39$, $SD = .22$) as compared with the option of continuing only the financial relationship ($M = .21$, $SD = .16$; $ps < .001$, $ds > .93$). There was no significant difference in participants' preference for the researcher to continue both the research and financial relationship or to continue only the research ($p = .584$, $d = .05$). These findings are sensible. Whereas the first and second options have a collective benefit, either to the researcher and participant or the researcher and society, the third option really only benefits the researcher. Thus, participants were sensitive to these different benefits, selecting options one and two equivalently and more frequently than option three.

Importantly, this analysis also yielded an interaction between affiliation and decision, $F(2,450) = 4.01$, $p = .019$, $\eta_p^2 = .018$. To better interpret this interaction, we conducted independent samples *t*-tests to compare decisions across the university affiliations. Participants were more likely to recommend that a researcher described as from their own institution should continue both the research and the financial relationship ($M = .44$, $SD = .22$) than if the researcher was from a competitor institution ($M = .36$, $SD = .21$), $t(227) = 2.52$, $p = .012$, $d = .33$. Participants were equally likely to report that a researcher should continue the research while severing the financial relationship, regardless of whether the researcher was described as from their own institution ($M = .38$, $SD = .21$) or a competitor institution ($M = .39$, $SD = .22$), $t(227) = –.48$, $p = .634$, $d = .06$. Participants were more likely to recommend that a researcher at a competitor institution should continue only the financial relationship ($M = .23$, $SD = .17$) than if the researcher was at their own institution ($M = .18$, $SD = .14$), $t(227) = –2.49$, $p = .013$, $d = .33$. These findings are consistent with motivated reasoning, such that evaluations of FCOIs are more favorable when participants have something to gain personally from the relationship.

There was also an interaction between disclosure and decision, $F(2,450) = 5.44$, $p = .005$, $\eta_p^2 = .024$. To better interpret this interaction, we conducted independent samples *t*-tests to compare type of decision across disclosure condition. Participants were more likely to indicate that the researcher should continue both the research and the financial relationship in the disclosure condition ($M = .44$, $SD = .21$) compared with the non-disclosure condition ($M = .36$, $SD = .22$), $t(227) = 3.02$, $p = .003$, $d = .40$. Participants were marginally more likely to report that the researcher should continue the research while severing ties with external supporters in the non-disclosure condition ($M = .41$, $SD = .23$) compared with the disclosure condition ($M = .36$, $SD = .20$), $t(227) = -1.84$, $p = .067$, $d = .24$. Participants were equally likely to indicate that researchers should continue the financial relationship while terminating the research in the disclosure ($M = .19$, $SD = .16$) and non-disclosure conditions ($M = .22$, $SD = .16$), $t(227) = 1.38$, $p = .169$, $d = .18$.

There was not a significant three-way interaction between affiliation, disclosure, and decision ($p = .462$), and no other significant effects emerged from

this analysis (all *p*s > .100). The lack of a three-way interaction indicates that the impact of disclosure and university affiliation may be independent of one another. Thus, participants reported that researchers should continue both the research and the financial relationship only if they have disclosed their FCOIs and continue the research while severing the external financial tie if their FCOIs had not been disclosed. However, participants believed it was more appropriate for researchers with FCOIs to maintain the financial ties while continuing the research activity if researchers were at their own institution compared with competitor institutions; however, they were more likely to indicate that researchers at competitor institutions should continue only the financial relationship while discontinuing the research compared with researchers at their own institution.

Thus, it appears that individuals are sensitive to the potential problems of FCOIs, regardless of whether it is a researcher at their own institution or a competitor institution. However, they are more willing to give a researcher the benefit of the doubt, so to speak, when researchers are from their own institution, as was reflected in greater support for researchers continuing both the research and the financial relationship. This latter situation is the most beneficial to participants themselves based on the cover story they received, because according to the ruse they had been told, the more money researchers obtained at their own institution, the greater the tuition rebate they could receive. Conversely, the more money researchers obtained at competitor institutions, the less available for them. The dynamic was zero sum. The upshot is that while participants are very sensitive to the problems associated with FCOIs, they are more inclined to overlook the impact of those problems if doing so benefits themselves.

Discussion and conclusion

In light of evidence presented above about motivated reasoning and difficulties associated with FCOI evaluation, these findings are perhaps not surprising. However, they support a point not previously studied experimentally: the impact of self-interest on FCOI disclosure assessment. Given the responsibility federal regulations place on institutions to review FCOI disclosures from their own researchers, and the institutional interests typically at stake in disclosure review contexts, these findings are thus significant.

Finding meaningful and realistic ways of improving the effectiveness of mandated disclosure is not easy, however. Of course, problems resulting from FCOI-induced incentives in research are remedied most thoroughly by removing the conflicts that give rise to them. However, this is not likely to occur, and neither is it clearly desirable. In an era in which public budgets are increasingly under pressure, it is unlikely that public support is forthcoming to allow significant limits to

industrial involvement in academic research. For example, resources available for NIH funding have declined 25% since 2003, adjusting for inflation (Alberts et al., 2014). Another unlikely change is a significant alteration in the way institutions and science itself encourages and even valorizes different kinds of behavior. As is true in other professional domains, the rewards for sticking up for what is ethical and honest in the face of temptations and pressures to do otherwise are not what they should be. Institutional climate, including the way those in positions of power are expected to react, has an disproportionate impact on individual decision making (Bicchieri and Xiao, 2009; van Gils et al., 2017).

Two more practicable reforms are worth mentioning. One idea, which has advocates in some medical research contexts, is a kind of centralized repository of FCOI disclosures (Dunn et al., 2016). Concurrent with grant applications, for example, or journal article submissions, researchers could be expected to register their conflicts of interest in a sort of global database. Though many details in such a system would remain to be worked out, it would have two notable advantages lacking in the current, highly fragmented, approach. First, it offers the possibility of a standardized approach to what counts as an FCOI. Little uniformity presently exists, for example, in the way journals define or report FCOIs. Second, global availability of FCOI disclosures would at least partially diffuse the current emphasis on local, institutional review. A second reform is a more whole-hearted embrace of the kinds of reforms currently advocated by the Open Science Network (Miguel et al., 2014). Pre-registering research studies of all kinds, not just large-scale clinical trials, as is now the case, could go a long way towards reducing some of the more flagrant research abuses.

At the same time, it must be acknowledged that tensions between financial interests and the norms of good science can perhaps never be smoothed over entirely. However, it is important to understand that while far from pointless, the effectiveness of disclosure at enhancing research objectivity is more limited than is often recognized.

Acknowledgements

Chris J. N. Lustgraaf provided helpful software programming assistance for this project.

Declaration of Competing Interest

The authors declare that there is no conflict of interest.

Funding

All articles in Research Ethics are published as open access. There are no submission charges and no Article Processing Charges as these are fully funded by institutions through Knowledge Unlatched, resulting in no direct charge to authors. For more information about Knowledge Unlatched please see here: http://www.knowledgeunlatched.org.

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