

Academic misconduct and criminal liability: Manipulating academic journal impact factors

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Abstract

Although initially created to help libraries determine which journals to include in their catalog, impact factors have become one of the most utilized measures of journal ranking and they are increasingly used for performance evaluations, tenure, promotion, and research grant decisions. It is also a measure that some editors manipulate and this manuscript questions the legality of that manipulation. Because impact factor manipulation distorts information on journal rankings, and since that information is used to make resource allocation decisions that affect the dispersion of federal funds, that distortion violates the False Statements Act. This deception is widespread; impact factor manipulation has been documented in journals across academia. Moreover, if editors coerce authors to add citations, then they may be putting those authors at legal risk as well. Following our argument that impact factor manipulation is illegal, we propose policy measures aimed at curbing the use of such manipulative strategies.

Key words: manipulating impact factors; False Statements Act; coercive citation; academic misconduct; citation cartels.

1. Introduction

Journal impact factors (JIFs) have become the primary measure of journal quality, and most journal rankings are now based on these calculations (Magnus 2013). Sometimes their use is controversial, but as Hoeffel (1998: 1,225) writes, ‘The use of the impact factor as a measure of quality is widespread because it fits well with the opinion we have in each field of the best journals in our specialty.’ However, a shortcoming of impact factors is that they can be manipulated (Martin 2016). Scholars overwhelmingly disapprove of such manipulation (Wilhite and Fong 2012) and some consider it to be unethical,¹ but in this manuscript, we go further to argue that impact factor manipulation is illegal.

In asserting that impact factor manipulation constitutes a crime, we argue that editors are making a false statement if they artificially inflate their journals’ impact factor because these artificially inflated scores materially misrepresent the impact of the journal on academic research. Furthermore, JIF scores can influence the distribution of resources by universities and universities receive federal funds. The involvement, or even potential involvement, of federal funds means that the manipulation of impact factors is a potential violation of the False Statements Act, 18 USC §1001.²

While it is probably true that most impact factor manipulation is not intended to misdirect public funds, such a level of intent is not necessary to break this law. Impact factor manipulators intend to deceive by artificially inflating their journal’s score, and an unintended consequence of their deception can be the misallocation of the public funds. That consequence is enough to lead to federal prosecution.

This manuscript proceeds in three stages. First, a brief literature review on research misconduct leads into the evolution, use, and misuse of impact factors. Second, we present the arguments that citation manipulation is illegal because it violates the False Statements Act. In that section, we argue that impact factor manipulation meets all five of the required elements of the law to be classified as a crime. This is followed by a discussion of other legal tools that might apply to JIF manipulation and close by exploring solutions to encourage academia move away from these forms of research misconduct.

2. JIFs and manipulating citations

It is well known that publishing is the single most important element of an academic’s performance evaluation, and thus the pressure to publish more and in higher quality outlets continues to grow; in

fact, Walker et al. (2010) find that number of publications and the JIF of those publications were identified as the two most important elements of an academic's performance review. However, academic pressure is not limited to authors. According to Monastersky (2005), JIFs are a mark of prestige, and editors are feeling pressure to raise their scores to ensure their journals stay relevant. This intense pressure has positive and negative consequences. On the one hand, it encourages authors and editors to increase the quality of their publications, to push academic innovation, for authors to make major scientific breakthroughs, and for editors to identify manuscripts of the highest quality and the most potential for citation. On the other hand, it can motivate scholars and editors to violate research norms (Necker 2014). There are many forms of research misconduct designed to increase an author's publication output, falsifying data and/or results (Fanelli 2009), opportunistically interpreting statistics (Anderson et al. 2007), and fake peer review (Ferguson et al. 2014) being some of the most severe. For the most part, these extreme examples appear to be relatively uncommon, but citation manipulation seems to be proliferating (Falagas and Alexiou 2008; Fong and Wilhite 2017; Martin 2016). We look closely at the manipulation of impact factors and argue that this manipulation is illegal.

Archambault and Larivière (2009) attribute the origin of the impact factor to a *Science* article published in 1927 by Gross and Gross who used citations contained in papers published in the *Journal of the American Chemical Society*, to determine what other chemistry journals should be included in their college's collection. Garfield and Sher (1963) transformed the impact factor to its current state, generalizing its calculation to rank any journal. The computation is relatively simple; you divide the number of citations to articles appearing in a journal over some time period (commonly two years), by the number of articles published in the journal. The resulting quotient is the impact factor. In theory, this is an objective measure of a particular discipline's evaluation of the merit of articles appearing in a journal.

Since Garfield and Sher's (1963) transformation, the JIF has become the most common method of ranking journals. Thomson Reuters, the institution that publishes *Journal Citation Reports* and calculates the impact factor, claims that the impact factor is a 'systematic, objective means to critically evaluate the world's leading journals'.³ Academia seems to agree; according to Sharma et al. (2014), JIFs are now commonly used to evaluate a journal's relative importance in its field. One reason for that broad adoption is that using citations to measure the influence of an idea has intuitive appeal; we should expect fundamental, important scientific discovery to be more frequently cited. Hoeffel (1998: 1,225) agrees, writing that JIFs are 'not a perfect tool to measure quality of articles, but there is nothing better . . .'. Garfield (2006: 980) writes, 'As a general rule, the journals with high impact factors are among the most prestigious today.' Given the way the impact factor is calculated, this view of 'prestige' means that higher impact factor scores are a signal that articles in the journal have greater influence, impacting other academic research more than if the impact factor score were lower. Journals with higher scores are given credit for more contributions and for helping to generate ideas in other scientific work. Garfield (1975: 1) states that 'The more frequently a journal's articles are cited, the more the world's scientific community implies that it finds the journal to be a carrier of useful information.'

The impact factor has also gained importance among academics and academic institutions for other applications (Cookson and Cross 2006; Martin 2016; Moed and Van Leeuwen 1995).

Individual scholars are being graded; as noted earlier, Walker et al. (2010) found that the number of publications and impact factors of those publications are the two most influential elements of an academic's performance review. Kiesslich et al. (2016: 1) note that impact factors are being used to 'measure and compare the scientific output of individuals or institutions'. They are increasingly used to help make decisions on tenure and promotion and merit raises at publically supported institutions of higher learning (Walker et al. 2010).

To illustrate how long the reach of JIFs has become, there are some countries in which the use of citation metrics is specifically part of the resource allocation, decision-making process. For example, the UK Research Evaluation Framework, Australia's Excellence in Research initiative, and Italy's Quinquennial Research Evaluation include citation-based evaluations in their distribution rules (Abramo et al. 2011). However, since the focus of this manuscript is the legality of impact factor manipulation and because the law is country specific, we concentrate on their use in the USA.

Because impact factors play a significant role impacting decisions in academia, editors pay significant attention to their relative rating and sometimes take action to increase their impact factors (Martin 2016). Of course, there are obvious and acceptable ways for editors to increase their impact factors; for example, 'to encourage the submission of better quality papers' (Martin 2016: 3). Editors might broaden readership through open access, identify emerging research fields, and/or invite well-known academics to the journal's editorial board (Cookson and Cross 2007). These are agreeable tactics to most academics. However, impact factors can also be manipulated in less acceptable, dubious, and inappropriate ways (Martin 2016). There are several known methods of impact factor score manipulation (Falagas and Alexiou 2008; Martin 2016). One is the use of editorials, comments, and letters in the journal. By a quirk of the JIF formula, these nonrefereed entries are not included in the denominator, but citations to them are added to the numerator. Moed and Van Leeuwen (1995) suggest that the heavy use of editorials and letters explains some of the high JIF in medicine and general science journals. A second strategy is to publish review articles or retrospectives on topics that have been recently covered in their journal. Opthof (2013) found an example where the *Journal of the American College of Cardiology* (JACC) published the equivalent of the review article with 292 reference of which 272 were recent self-citations (i.e. citations to articles published in their journal) that influenced JACC's impact factor.

A third strategy is to coerce citations. Wilhite and Fong (2012) survey a broad range of academic researchers in business and the social sciences asking about coerced citations defined as requests for self-citation where the editor (1) gave no indication that the manuscript was lacking in attribution, (2) made no suggestion as to specific articles, authors, or a body of work requiring review, and (3) only guided authors to add citations from the editor's journal. While there was variation across disciplines, some journals were named as coercers. A more recent study extends those results to find coercive citation spanning the academic spectrum as scholars report coercive experiences in science, engineering, and medicine in addition to business and the social sciences (Fong and Wilhite 2017).

According to Martin (2016), as Thomson Reuters (now Clarivate Analytics) began to question high, within-journal, self-citation counts, some editors began to collude to create cross-journal citation schemes. Collusive citation, also known as citation cartels, involves one journal publishing a review article that heavily cites another journal, typically one that has some editorial connection.

Van Noorden (2013), Naik (2012), and Davis (2012) investigate specific cases of this behavior.

A more recent manipulation strategy stems from the growing practice of making accepted articles available to readers online before they are officially published in the physical journal (Martin 2016). By making a paper available online, but delaying its physical publication, the manuscript accumulates citations and when it is officially published, it can already have several references to its work. Consequently, if publication was delayed for one year, it has three years of citations included in its two-year impact factor calculation—overstating its impact.

Thomson Reuters and Clarivate Analytics are aware of issues regarding manipulation of impact factors and they recognize that artificially inflated JIFs are not a reliable means to critically evaluate journals. Consequently, they will suspend a journal from their rankings, leaving that journal out of the rankings for a period, if they detect an overuse of self-citations (Clarivate Analytics 2017a; Grant 2012; Minnick 2017). They also calculate and publish additional citation metrics that are less prone to manipulation.

In the end, there are multiple methods through which editors try to inflate their impact factor scores. This might be seen as little more than a marketing ploy, a way to raise the profile of their journal and to encourage scholars to read articles in their journal, but the consequences can be far-reaching. Martin (2016: 7) writes, ‘If editors themselves are engaging in inappropriate or dubious behavior, they will surely be seen as lacking in credibility and authority ... The consequences could be untold.’

This manuscript addresses one of those untold consequences; manipulating a journal’s impact factor score could violate federal law, specifically the False Statements Act. To establish that claim requires a systematic review of the law and arguments that editorial manipulation meets each of the required elements. That review, and the related arguments, is the subject of Section 3.

3. Manipulating citations and criminal liability

The False Statements Act has its roots in the Civil War. In 1863, Congress enacted the False Claims Act, which made it illegal to present false claims to the government, including language that criminalized the making of a false statement for the purpose of obtaining payment of a false claim.⁴ Through the history of the False Claims Act up to 1934, false statements were criminalized only if there was intent to defraud the US government of money. In 1934, Congress amended the act, removing the requirement that a false statement be for the purpose of financial fraud and enacted what is, in substance, the False Statements Act of today.⁵ In 1948, Congress separated the False Statements Act from the False Claims Act.⁶

The False Statements Act has been used to prosecute research misconduct. In *U.S. v. Anghaie*, Dr Samin Anghaie and his wife were convicted of making false statements in a grant application.⁷ They were awarded a research grant and also made false statements and claims as to grant funds. In *U.S. v. Thompson*,⁸ the defendant was convicted of making false statements in claims for payment on a US government funded research grant. The defendant was also convicted on counts of making false claims and wire fraud.

It may be noted that the two preceding cases involved financial fraud at the expense of the US Government. However, financial loss is not an element of the crime of making a false statement, under 18 USC §1001.

According to the current law, the elements of the crime are as follows: (1) that a statement was made; (2) that it was false; (3) that

it was material; (4) that it was made with specific intent; (5) that it was within the jurisdiction of the USA.⁹ We argue that JIF manipulation meets all of these elements of the crime of making a false statement.

3.1 A statement was made (statement)

A statement can be any statement or representation,¹⁰ sworn or unsworn,¹¹ whether required by the government or not,¹² whether in writing or not.¹³ Section 1001 liability also extends to affirmative concealment of a material fact.¹⁴ Even nondisclosure can be the basis for a §1001 conviction, if the defendant has a duty to disclose.¹⁵

Clearly, if an editor refers to a journal’s impact factor as some reflection of the journal’s rank, influence, or prestige, such a decision would comprise a statement or representation. More commonly, if a publishing house uses the impact factor score of journals, it publishes in advertising or presents it as a measure of impact or ranking, again a statement or representation is made. This second case is rampant; visit the website of almost any of the major journal-publishing houses and the impact factor scores of the journals they publish are displayed as part of their promotion strategy. Some publishers calculate their own journal impact measures and tout those metrics as reflecting impact, relevance, or some other aspect of journal prestige. These are also statements. Finally, impact factors appear in tenure and promotion dossiers, annual reviews, and official vita of faculty members, as evidence of the prestige of a journal in which one publishes. All of these activities comprise statements or representations, and the statement is one of impact, influence, or prestige.

3.2 It was false (falsity)

Was a statement or representation false? A ‘false statement’ proscribed by the False Statements Act¹⁶ is made when an actor: (1) falsifies, conceals, or covers up by any trick, scheme, or device a material fact; (2) makes any materially false, fictitious, or fraudulent statement or representation; or (3) makes or uses any false writing or document knowing the same to contain any materially false, fictitious, or fraudulent statement or entry.

Falsity can be established by showing that there was a false representation or concealment of a relevant fact.¹⁷ The former requires proof of actual falsity, whereas concealment must be established through evidence of willful nondisclosure by means of a ‘trick, scheme, or device.’¹⁸ In *U.S. v. Keplinger*, the defendants’ convictions were upheld based on suppression or falsification of data in drug safety trials.¹⁹ The defendants suppressed or falsified data that were ultimately the basis for a report, which in turn was submitted to the Food and Drug Administration. This was determined sufficient for a jury to convict defendants for making false statements.

Central to the legal arguments is that JIFs are not just numbers calculated as citations divided by citable documents. As documented in the previous section, they are widely used as a measure of journal rank or prestige, used to compare journals and increasingly used in performance evaluations. Thompson Reuters and Clarivate Analytics, the entities that generate the score, explicitly claim that the impact factor is an evaluative tool that can be used to compare and rank journals and they act to defend its integrity as a useful metric. Specifically, when they perceive that a journal has significantly manipulated its score, they suspend that journal for a period of time and for that punishment period does not appear in its rankings (Clarivate Analytics 2017a). In addition, publishers and editors use

the impact factor to broadcast their journals' prestige; increases in their scores become marketing focal points, and scholars use it to make allocative decisions. In fact, there is a growing literature that suggests impact factors may have too much influence and that too many decisions rely on JIFs (Monastersky 2005; Nature 2005). Thus, when editors manipulate using techniques to artificially inflate their JIF score, they are misleading the academy about their journal. Manipulated citations are not evidence that their journal is impacting scientific research. Instead, it is editors using a trick or scheme to inflate their score, materially misrepresenting the impact of their journal.

There is also criminal liability when an actor recruits others to make a false statement.²⁰ 18 USC §2(b)²¹ imposes liability as a 'principal' on anyone (i.e. an accessory to the crime) who deliberately causes another person to perform an act that would violate federal criminal law, including the making of a false statement.²² In other words, if editors coerce authors to add superfluous, self-serving citations to a manuscript, or if publishers pressure editors to increase their JIF score through manipulative means, those actions qualify as a deliberate attempt to cause another person to make a false statement. The government has prosecuted cases in which actors are recruited to make false statements, for example, in *Milton v. U.S.*, the defendants were convicted of aiding and abetting the making of false statements when they recruited claimants to make false claims for money damages against an Equal Employment Opportunity Commission (EEOC) settlement fund, which the Defendants were charged with administering.²³

3.3 It was material (materiality)

Materiality deals with the consequences of actions taken by the individuals committing a potentially criminal act. To be clear, the US Supreme Court has determined that the question of materiality is an issue for jury determination.²⁴ However, materiality does not require that false statements actually influence a decision within the jurisdiction of a branch of the US Government. It is enough that a false statement *reasonably might influence a governmental decision*.²⁵ Given the vast literature on the influence of impact factors on library spending and on tenure, promotion, and merit raises, it seems highly likely that a jury can be convinced that JIFs might influence decisions related to the use of federal funds.

It is important to note that it is not a requirement that the makers of the false statement intended to use that statement to defraud the government, but just that the statement was false and that it could reasonably influence a government decision. This is where the unintended consequences of impact factor manipulation take root. Right or wrong, impact factors influence many academic decisions that have consequences for the dispersion of government funds. As discussed above, impact factors influence reference collections (Enger 2009) and increasingly influence decisions on merit pay and tenure and promotion (Cookson and Cross 2006; Walker et al. 2010). A critical legal point is that the false statement need not be submitted to an agency of the Federal government, but that it is sufficient that the statement influences an entity that receives federal funds or is subject to Federal government oversight. Virtually all institutions of higher learning in the USA receive federal funding through federal student loans and grants. Therefore, when JIFs influence decisions made by any of these institutions, the False Statements Act is violated.

3.4 It was made with specific intent (intent)

The intent requirement embodied in 18 USC §1001(a)²⁶ is a 'knowing and willful' false statement. Although the original intention of the False Statements Act was to combat false or fraudulent claims against the government, intent to defraud is no longer a requirement. It is enough that the actor intended to deceive.²⁷ Moreover, 'knowing and willful' does not require knowledge that the making of the false statement is illegal, merely that it is false.²⁸ Furthermore, avoiding knowledge of a false statement is insufficient to avoid liability because courts have approved of the substitution of deliberate ignorance for actual knowledge.²⁹ In *U.S. v. Delgado*, the 5th Circuit Court of Appeals determined that where a defendant: (1) was subjectively aware of a high probability of the existence of illegal conduct; and (2) purposely contrived to avoid learning of the illegal conduct, a jury may be instructed that 'deliberate ignorance' is sufficient to show knowledge on the part of the defendant.

Manipulating impact factors refers to the use of the tactics detailed by Martin (2016) to raise the JIF score, artificially inflating their journal's rank and prestige. Such deception is intentional; they are trying to inflate the score. In all likelihood, those manipulators do not intend to defraud the US government, but that level of intent is not required. All that matters is that the perpetrators know that they are manipulating a journal's impact factor. That is the intentional false statement. If for some reason down the road that inflated score might affect the allocation of government resources, then their actions run afoul of the False Statements Act. Using impact factor scores as marketing tools and viewing manipulation as relatively harmless ignores the fact that the manipulated score can be used at a later date, a time and place that is not under your control, to impact government resources. The editors' and publishers' knowledge that it was false ties them to those later actions.

3.5 It was within the jurisdiction of the USA (jurisdiction)

For criminal liability to result from a false statement under the False Statements Act, the statement must be within the jurisdiction of some branch of the US government. It may be the executive, legislative, or judicial branch. It is clear that these statements are not made during judicial proceedings, and thus outside the jurisdiction of the Judicial Branch of the US government. And, for a false statement made to the Legislative Branch to violate the Act, the statement must relate to: (1) administrative matters, including a claim for payment, a matter related to the procurement of property or services, personnel or employment practices, or support services, or a document required by law, rule, or regulation to be submitted to the Congress or any office or officer within the legislative branch; or (2) any investigation or review, conducted pursuant to the authority of any committee, subcommittee, commission, or office of the Congress, consistent with applicable rules of the House or Senate. There are instances in which this legislative jurisdiction might apply, for example, expert testimony to congress. However, a false statement within the jurisdiction of the executive branch has fewer limitations and is the jurisdiction where impact factor manipulation resides.

Courts have found that a false statement is within the jurisdiction of the US government: (1) whether or not the actor knows the government has jurisdiction over the statement³⁰; (2) whether or not the statement is communicated directly to the Federal government³¹; (3) when a statement is made to a state or local government, which

receives federal funds, or is otherwise overseen by the federal government³²; or (4) when a false statement is made to a third party, where the third party plays a role in influencing a government agency's decision.³³ Thus, if impact factor scores appear on an application for tenure or promotion, if they are used in performance evaluations or appear in grant applications, and if that institution receives federal money, those statements are clearly within the jurisdiction of the US government.

Jurisdiction may also be found in statements where the interests of the US government are not as direct. For example, to receive US government funds, and even to qualify as an institution whose students can receive direct or subsidized student loans or grants, institutions of higher learning must be accredited by an appropriate accrediting agency. These accrediting agencies maintain requirements for accreditation and among the facts examined by accrediting agencies are the availability of library resources and criteria for making tenure and promotion decisions.³⁴ Impact factors can influence all of these decisions (Enger 2009; Magnus 2013; Monastersky 2005). Consequentially, any institution receiving US government funding is within the jurisdiction of the US government.³⁵

With these points, we suggest there is a credible case for prosecution.

4. Discussion

This manuscript is not intended to argue for increased governmental oversight and prosecution of academic journals, nor do we contend that the False Statements Act is the statute prosecutors would choose to enforce if a decision to prosecute was made. Instead, our goal is to raise the academy's understanding about the severity of citation manipulation. Some academics view manipulation as a simple marketing technique and now, as part of the publishing process. Our hope is that by showing it violates federal law; its widespread use may be reconsidered.

Currently, there have been no false statement cases involving citation manipulation, but the US Justice Department has a growing record of pursuing research misconduct. A current case that directly involves impact factor fraud is *Federal Trade Commission v. OMICS Group, Inc.*, a civil case presently before the US District Court for the District of Nevada. The facts in this case, as presented by the US Justice Department, are particularly egregious. Basically, the USA alleges that OMICS Group Inc. has a business model of claiming various indicia of academic legitimacy that it, in fact, does not possess. OMICS publishes a variety of journals and sponsors academic conferences. In its motion for summary judgment presently pending before the District Court, the government alleges that OMICS Group claims JIFs, inclusion in various academic indices and that, with regard to academic conferences, inclusion of recognized scholars as attendees and participants, when in fact none of OMICS journals have impact factors at all, they do not appear in the indices and many of the academics listed as attendees and participants in OMICS conference disavow any affiliation with these conferences.³⁶ This US District Court case is a civil case brought by the US Federal Trade Commission (FTC) alleging that OMICS engages in false advertising, as set out above, in violation of the FTC Act prohibition on 'unfair or deceptive practices in or affecting commerce'.³⁷ This is an allegation of false advertising and not a criminal false statement, which means that the government need not show intent or that a false statement is within the jurisdiction of a US agency to prevail.

The OMICS Court has entered a preliminary injunction prohibiting the defendants' deceptive practices. A permanent injunction and monetary damages are the subject of the Government's Motion for Summary Judgment, presently pending before the court.

Similarly, the US Justice Department regularly prosecutes research fraud involving US government funded grants. For example, in *U.S. v. Ding*,³⁸ the defendant Yujie Ding and Yuliya Zotova, husband and wife, obtained a federally funded research grant and Zotova was named the principal investigator. The funded work was performed, but not by Zotova. The prosecution was for wire fraud based on false representations in invoices that Zotova had performed the research. In his Motion for Acquittal, Ding argued that there was no intent to commit fraud, as evidenced by the fact that the work was performed. The Court refused the acquittal motion because the invoices (statements of work) were purposely false, and therefore the fraud was intentional; the named principal investigator did not perform the work.

Thus, several federal statutes might apply to citation manipulation, but all of them involve falsity and for that reason we focus on the False Statements Act. It seems unlikely that citation manipulation will be prosecuted in a federal court anytime soon because there is no financial return to such a case; the False Statements Act does not provide for financial redress. However, the government does have a public interest in limiting the distortion of academic research and in today's polarized political climate, an ambitious attorney general could make a name for themselves by challenging the practices and indirectly the trustworthiness of academic publication. It is in our collective interests to stop artificially inflating citations.

What steps can the academe initiate to curtail such manipulation? First, editors need to realize the full consequences of their behavior. If anything, what message do coercers send when they target junior faculty; those individuals who are in the stage of their career when mentorship most matters? Where will the ethical direction of our profession go as more faculty members face these dilemmas and begin to accept them as the norm? We need better guidelines.

Second, we should reduce the benefit of citation manipulation by eliminating self-citations from impact factor calculations. This simple act removes the incentive to coerce authors, to write self-serving editorials, and to publish review manuscripts with dozens of citations to oneself. In fact, many impact factor calculations, including and excluding self-citations, exist; however, multiple impact factors give journals the opportunity to adopt and advertise the factor that puts them in the best light. Thus, journals willing to manipulate their citations can use measures that can be manipulated to promote their journal, perhaps not realizing that those numbers might constitute a false statement in the legal sense.

Third, to reduce the use of citation cartels, more effective and more stringent analytics should be developed to detect collusion between journals. Thomson Reuters and Clarivate Analytics already have procedures that identify extreme cases of citation cartels (what they called stacking); perhaps they need only to tighten their criteria. Finally, the incentive to post manuscripts on the web to gather citations prior to publication can be removed by adopting a consistent start date. For a two-year impact factor, the start date should be the date the manuscript was made public. Journals can still put manuscripts on the web so their publishing backlog will not delay the introduction of research findings to the academic community, but that posting starts the clock. Then, all journals would be scored over the same time frame.

It is important to reiterate that false statement liability may extend to the authors who add coerced citations. Thus, authors are

both victims of coercion and perpetrators of citation manipulation. Those authors know that the JIF has been artificially increased, and by including the journal's impact factor on an application for tenure, promotion, or a grant for federal funding, the applicant is making a statement that is within the jurisdiction of the US government.

Are the entities that generate and promote these ratings also violating the False Statements Act? Probably not. *Journal Citation Reports* suppresses journals when they detect a certain level of manipulation, and this should help to insulate them from prosecution. However, are they doing enough? Davis (2017) suggests not, writing that the level of manipulation needed to trigger a suspension is 'set absurdly high' and Clarivate Analytics (2017a) states that 'Suppressed journals represent the extreme outliers in citation behavior.' Given the increasing literature on citation manipulation, it could be argued that they are knowingly ignoring manipulation on smaller scales, and thus issuing false statements. However, Clarivate Analytics (2017b) also writes, 'The impact factor should be used with informed peer review' which limits their exposure because their actions are not 'reckless'.

While the focus of this manuscript has been the legality of citation manipulation, the purpose of our manuscript is not a legal exercise, instead we hope to encourage policy change that will discourage the manipulation of JIF scores. To emphasize the need for change, we show that when someone ventures into making ethically questionable decisions, the consequences can be far-reaching and unforeseen. Something that seems as harmless as inflating impact factors to bolster a journal's image may be illegal. And, even if the intent of the original manipulation was not to defraud the government, the purposely misstated rankings can influence the allocation of public funds by another individual, at another date, or in another venue and then their original misstatement violates the False Statements Act.

We also recognize that we have laid out the necessary steps for a prosecutor to press charges against those manipulating impact factors. We do not encourage such action, but we encourage the academe to get in front of this issue by changing policy and avoiding such disruption.

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Notes

1. See Editor Ethics 2.0, <<https://editorethics.uncc.edu/editor-ethics-2-0-code/>> accessed on 31 August 2018.
2. 18 USC §1001 refers to section 1001 of Title 18 of the United States Code (USC). The USC is the codification of the statutes of the USA. Title 18 contains the criminal statutes.
3. The *JCR* was sold to Clarivate Analytics, a spin-off of Thomas Reuters in 2016. Clarivate Analytics, who now calculates the impact factor, makes a more pointed claim writing, 'We remain committed to publishing meaningful metrics that accurately represent a journal's usage and influence' (Clarivate Analytics 2017a: 6).
4. Act of 2 March 1863, 12 Stat. 696 (1863).
5. *Hubbard v. U.S.*, 514 U.S. 695, 706 (1995).
6. Public Law (Pub. L.) 80-772, 62 Statutes at Large (Stat.) 683, (1948).
7. *U.S. v. Anghaie*, 1:09-CR-3 (N.D. Fla. 2011).

8. *U.S. v. Thomson*, 2015 U.S. Dist. LEXIS 68759 *; 2015 WL 3440858 (D. So. Dakota 2015).
9. *U.S. v. Calhoon*, 97 F.3d 518 (11th Cir. 1996).
10. *U.S. v. Gilliland*, 312 U.S. 86(1941).
11. *U.S. v. Des Jardins*, 722 F.2d 578 (9th Cir. 1985).
12. *U.S. v. Fitzgibbon*, 619 F.2d 874 (10th Cir. 1980).
13. *U.S. v. Fitzgibbon*, 619 F.2d 874 (10th Cir. 1980).
14. *U.S. v. Curran*, 20 F.3d 560 (3rd Cir 1994).
15. *U.S. v. Mattox*, 689 F.2d 531 (5th Cir. 1982).
16. USC, Title 18, Section 1001, subsection a, articles 1-3; 18 USC §1001(a)(1)-(3).
17. *U.S. v. Calhoon*, 97 F.3d 518 (11th Cir. 1996).
18. *U.S. v. Curran*, 20 F.3d 560 (3rd Cir. 1994); *United States v. Mayberry*, 913 F.2d 719, 722 n. 7 (9th Cir. 1990); *United States v. Anzalone*, 766 F.2d 676, 682 (1st Cir. 1985); *United States v. Tobon-Builes*, 706 F.2d 1092, 1096 (11th Cir. 1983); *United States v. Diogo*, 320 F.2d 898, 902 (2d Cir. 1963); see also *United States v. Kenny*, 236 F.2d 128 (3d Cir. 1956).
19. *U.S. v. Keplinger* 776 F.2d 678 (7th Cir. 1985). In Keplinger, the defendants suppressed relevant information or falsified data by: (1) underreporting mortality of research animals and comingling animals original test animals with animals introduced to the trial at a later time; (2) omission of histopathological data on research animals; (3) omission of data on postmortem examination of test animals; (4) failure to report adverse expert opinions. The Court determined that this constituted sufficient evidence to establish a materially false statement to support a jury conviction.
20. *Milton v. U.S.*, 8 F.3d 39 (D.C. Cir. 1993).
21. USC, Title 18, section 2, subsection b.
22. *U.S. v. Curran*, 20 F.3d 560 (3rd Cir. 1994).
23. *Milton v. U.S.*, 8 F.3d 39 (D.C. Cir. 1993). In *Milton*, the Defendant John Milton was a staff attorney for the US EEOC. In that capacity, he settled an employment discrimination claim on behalf of the EEOC. Subsequent to the settlement he had responsibility for evaluating claims against the settlement fund. John Milton and his brother, James Milton solicited a total of nine people to submit false claims. The nine claimants were paid from the settlement fund and received from the claimants a portion of the amount paid the claimant. Both John and James Milton were convicted of theft of government money and aiding and abetting the making of materially false statements.
24. *U.S. v. Gaudin*, 515 U.S. 506 (1995).
25. *U.S. v. Chen*, 324 F.3d 1103 (11th Cir. 2003); *U.S. v. Sarihifard*, 155 F.3d 301 (4th Cir. 1998); *U.S. v. Parsons*, 967 F.2d 452 (10th Cir. 1992).
26. USC, Title 18, section 1001(a).
27. *U.S. v. Shah*, 44 F.3d 285 (5th Cir. 1995); *Nilson v. U.S.* F.2d (4th Cir. 1985).
28. *U.S. v. Hsia*, 176 F.3d 517 (D.C. Cir. 1999).
29. *U.S. v. Calhoon*, 97 F.3d 518 (11th Cir. 1996); *U.S. v. Delgado*, 668 F.3d 219 (5th Cir. 2012).
30. *U.S. v. Yermian*, 468 U.S. 63 (US S. Ct 1984[27 June]) (false statements made to an private employer on a DOD security clearance questionnaire); *U.S. v. Heuer*, 4 F.3d 723 (9th Cir. 1993) (false statements on a bill of lading provided to a common carrier that cargo was 'propellant' rather than hazardous waste); *U.S. v. Ross*, 77 F.3d 1523 (7th Cir. 1995) (submissions to an academic accreditation agency, not required by DOE or submitted directly to the DOE).

31. *U.S. v. Yermian*, 468 U.S. 63 (US S. Ct 1984); *U.S. v. Heuer*, 4 F.3d 723 (9th Cir. 1993); *U.S. v. Ross*, 77 F.3d 1523.
32. *U.S. v. Shaffer*, 199 F.3d 826 (6th Cir. 1999).
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35. *U.S. v. Yermian*, 468 U.S. 63 (US S. Ct 1984); *U.S. v. Heuer*, 4 F.3d 723 (9th Cir. 1993); *U.S. v. Ross*, 77 F.3d 1523.
36. *Federal Trade Commission v. OMICS Group, Inc.*, No. 2:16-cv-0202 (Dist. Ct Nevada).
37. 15 USC §45.
38. *U.S. v. Ding*, No. 16-3768 (3rd Cir. 2018).

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