



The Writing Style of Predatory Publishers

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Abstract

In 2010, librarian Jeffrey Beall started a list of journals that allegedly use predatory practices to recruit manuscripts for publication. Coined “Beall’s List,”¹ this working catalogue highlights over two hundred open-access journals that may feign editorial processes, peer-review, or other procedures of a reputable publisher. Given the recent attention to scientific misconduct²⁻⁸, an important question is whether there are methods to detect predatory publishers from authentic ones.

In this study, we apply an automated language analysis technique from the social sciences to examine how predatory and authentic journals differ in their writing style in the About Us and Aim/Scope sections of their websites. Compared to authentic journals, predatory journals use more discrepancy terms (e.g., “should” “would”) and positive emotions (e.g., “exciting”) but fewer function words, including articles (e.g., “a” “the”), and prepositions (e.g., “before” “in”), quantifiers (e.g., “more” “less”), and terms related to causality (e.g., “therefore”). These results follow recent patterns in the deception literature⁹⁻¹³, suggesting that language features may be useful when evaluating predatory versus authentic publishers.

In addition to analyzing writing style, we examined meta-linguistic properties of predatory publishers (i.e., editorial statistics, website features, and contact information) from the same database of journals. Compared to authentic publishers, predatory publishers use more third-party email addresses, claim false impact factors, fake rapid peer review, and simulate academic expertise. This is the first study to investigate predatory publishing through an empirical social science lens and our results suggest that there are quantifiable linguistic and meta-linguistic indicators that can, to some degree, distinguish between predatory publishers and those journals that seek to publish honestly.

Introduction

In recent years, the rise of scientific misconduct has drawn attention to the “publish or perish” mentality consuming academia, which highlights a drive for researchers to publish early and often in their career.³ The pressure to publish regularly can tamper with the quality of research and the moral compass of academics across disciplines. When misconducts are discovered (i.e., data fabrication or falsification), publications are typically withdrawn from the journal via retractions. In the past decade, the number of retraction notices has increased ten-fold⁴ and the problem is steadily becoming worse.⁵

Until recently, little academic work has examined scientific misconduct. High-profile cases of fraud in Social Psychology have popularized the issue,⁷ but the majority of the empirical literature has surveyed the prevalence of misconduct to understand its scope. Another form of deception in science has been overlooked, however: predatory publishing. This describes a phenomenon of open-access publishers feigning editorial processes, peer-review, or other procedures of a reputable publisher in order to attract high publication fees. Predatory publishing impacts the science enterprise because it questions whether academics can distinguish between real and fake research. Furthermore, if scientists base their own research on publications that have not been thoroughly vetted, this may lead to a significant decrease in the quality of research in circulation.

Predatory journals act as a revolving door for manuscripts and academics who want to publish quickly and effortlessly. Many predatory journals appear genuine and the journal title may match an authentic publisher. For example, the Journal of Cloud Computing is a publication by SpringerOpen (authentic) and IBIMA Publishing (predatory).² This duplicity can mislead researchers and becomes problematic when scaled to larger domains of science. Given the difficulty academics may experience in distinguishing predatory from authentic journals,¹⁴ an important empirical question asks if there are differences in how these journals market themselves to academics. By using automated linguistic-analysis techniques from the social sciences we provide the first study measuring how predatory journals describe themselves differently on their websites relative to authentic publishers. To complete our investigation, we also incorporate a meta-linguistic analysis to understand how certain predatory traits are reflected online.

Predatory Publishing Explained

Jeffrey Beall, a librarian and Associate Professor at the University of Colorado Denver, first documented an issue with academic publishing in 2010 and created “Beall’s List.”¹ This working document highlights over two hundred journals that fail to meet standards akin to authentic, established publishers. He uncovered that predatory publishers typically have six defining features. According to Beall’s taxonomy, predatory publishers:

1. “Publish papers already published in other venues/outlets without providing appropriate credits.
2. Use language claiming to be a ‘leading publisher’ even though the publisher may only be a startup or a novice organization.
3. Operate in a Western country chiefly for the purpose of functioning as a vanity press for scholars in a developing country.
4. Do minimal or no copyediting.
5. Publish papers that are not academic at all, e.g. essays by laypeople or obvious pseudo-science.
6. Have a ‘contact us’ page that only includes a web form, and the publisher hides or does not reveal its location.”¹⁵

Essentially, predatory publishers deceive academics by faking the practices and policies of top journals (e.g., peer review, editorial boards, impact factors). In doing so, predatory journals have the potential to degrade the quality of research in circulation and they reduce the likelihood of scholars publishing in reputable and prestigious journals. With scientific misconduct on the rise,^{4,5} it is important to understand how predatory publishers may contribute to concerns about integrity in science. In this study, we use publically available data (i.e., information on a publisher’s website) to compare language differences between predatory and authentic journal text from the About Us and Aim/Scope sections. Do predatory journals write and describe themselves differently than authentic journals? In order to answer this question, we first address relevant work in the deception field to examine the role that language plays in understanding truthful and dishonest discourse patterns.

Deception and Writing Style

Prior to 2000, the majority of deception research sought to uncover nonverbal cues, such as fidgeting, gaze aversion, or particular hand-movements, that may reveal deception in face-to-

face interactions.¹³ Contrary to popular belief, there are no universal cues that reliably indicate deception, and the search for “Pinocchio’s nose” has met with little success.¹³ This realization has led many scholars to study deception from another angle: language and word patterns. With modern advances in computer science, the method of using computerized text-analysis to differentiate false from truthful speech has been widely applied across a range of contexts.¹⁶ In a seminal work from Newman, Pennebaker, Berry, and Richards (2003),¹⁷ automated linguistic analysis uncovered differences between false and truthful speech on abortion attitudes, attitudes towards friends, and a mock crime. Their work started a trend of researchers using computers to analyze writing style, particularly because of this method’s objectivity and the resources that were saved by not employing humans to judge word types.¹⁶

Writing style differences have been an interest for deception researchers in a variety of areas. Deceptive and truthful utterances have been compared across Computer-Mediated Communication technologies,¹⁸ statements made by American presidents,¹⁹ online dating profiles,¹² and user-generated content including hotel reviews¹¹. These studies have revealed that psychological dynamics associated with deception can be revealed in language. For example, compared to honest language, deceptive language tends to feature an increase of negative emotion terms (e.g., hate, aggression, hurt) as a reflection of the guilty or anxiety associated with lying.⁹ Many of our social relationships are built on honesty, and deception has the potential to jeopardize interpersonal trust. Therefore, it becomes distressing to lie to a friend or colleague, and an increase of negative emotions reflects this apprehension.^{9,13,17} Deceptive speech also tends to feature fewer first-person singular pronouns (e.g., I, me) as a mechanism of psychological distancing. Liars typically distance themselves from deceit by using fewer “I-words” and increasing the number of social references (e.g., he, she, they) in order to deflect attention from the self. It is personally and socially damaging to be called a liar; therefore, removing the self from a lie is ideal for face-saving and relationship-saving strategies.^{9,17} Finally, lies are usually less detailed than truths because it is difficult to give specifics about information that is fabricated. The number of quantifiers (e.g., more, less) is one example of language specificity, and lies often contain fewer quantifiers than truths.⁹

The Influence of Context on Deceptive Writing Style

Despite the aforementioned findings, deception patterns are not identical across research domains.²⁰ As circumstances change, the psychological dynamics and associated patterns of language use should change as well. That is, deception cues are not universal because of important shifts in context along at least three proposed dimensions: psychological dynamics, goals, and genre conventions. In order to successfully understand how people lie in different scenarios, the psychological impact of the deception (i.e., emotional and cognitive involvement) must be considered. An understanding of the pragmatic goals for engaging in deception may reveal the purpose of the lie and explain how the particular instance of deceit is different than others that came before it. Finally, in order to account for changing environments of deception, we argue that considering genre conventions (i.e., speaking in slang versus an academic manner) will provide additional information about why liars speak differently than truth-tellers.

While this contextual framework is novel, it is grounded in previous literature.^{9,17,19} For instance, one of the most reliable indicators of honest speech, first-person singular pronouns, is typically reduced in deception.^{13,17} This finding has been replicated across a variety of

studies^{9,13,17,19}, but is it a relevant cue for science publishing? Considering our current interest where self-references are rarely used in academia, it seems unreasonable to expect deceptive journals to use more or fewer “I-words” compared to authentic journals. Instead, a diagnostic method of understanding language differences between predatory and authentic journals should consider the three elements of context as they relate to science writing. Particularly, psychological dynamics will capture the amount of emotional language (e.g., affect terms, positive emotion words, negative emotion words), language related to linguistic complexity (e.g., function words, articles, prepositions) and detailed information (e.g., quantifiers) in text. The pragmatic goals of science writing will also be addressed with a readability index to measure the level of obfuscation in predatory and authentic text. Finally, genre conventions will examine the number of insight terms, terms related to causality, and discrepancies to understand if predatory journals use more science-oriented language to convince academics to publish in their catalogue.

Context: Psychological Dynamics

The first element of context is the psychological dynamics related to the emotional or cognitive involvement of a speaker. This considers the total number of positive and negative emotions terms. We argue that predatory publishers will attempt to “sell” academics on their journal by offering the same benefits as authentic publishers. This finding has been observed in online opinion spam, where fake hotel reviewers use more positive emotions to describe a hotel that they never stayed in.¹¹ We predict that predatory journals will use more affect language and more positive emotions than authentic journals in order to convey the advantages of the publisher and convince the researcher of legitimate publishing practices. Additionally, we predict that predatory publishers will use fewer negative emotions in order to deflect any suspicion from the fake journal. While this suggestion goes against typical findings in the deception research, we believe that any negativity could lead to potential reservations for the researcher. Therefore, predatory journals will try to avoid negative emotions.

Hypothesis 1: Relative to authentic publishers, predatory publishers will use more affect language and positive emotions, but fewer negative emotions.

The second element of psychological dynamics refers to the linguistic complexity of discourse. Typically, false statements are less complex than truths because it takes a substantial amount of mental effort to fabricate information.^{9,13} The decrease in cognitive and linguistic complexity should be reflected in a reduced number of function words (e.g., it, if), articles (e.g., a, an, the), and prepositions (e.g., at, in, on) in false speech compared to truthful speech. Function words and articles are small, uncontrollable parts of text that commonly go unnoticed in everyday discourse,²¹ but they are powerful indicators of linguistic complexity. Prepositions suggest the number of concrete categories used in language and are commonly reduced in deception as well.¹⁷ Finally, the last language feature related to psychological dynamics is quantifiers (e.g., greater, significant, total), which are terms considering the amount of detail and specificity in text. We argue that predatory publishers will use fewer quantifiers and less detailed information due to the difficulties associated with creating a statement from false, fabricated, or imaginary information. Taken together, we predict that predatory publishers’ websites will be less linguistically complex (i.e., fewer function words, articles, and prepositions) and less detailed (i.e., fewer quantifiers) relative to authentic journal websites.

Hypothesis 2: Relative to authentic publishers, predatory publishers will use less complex language with fewer function words, articles, prepositions, and quantifiers.

Context: Pragmatic Goals

The second feature of context is pragmatic goals. We have outlined that the goal of a predatory publisher is to feign authenticity and simulate processes of a top journal in order to attract academics. How will this be expressed linguistically? To answer this question, we turn to the linguistic obfuscation hypothesis from the consumer behavior literature.²² The linguistic obfuscation hypothesis derives from Curtis (1998), who found that fake financial reporting is obfuscated to a greater degree than genuine financial reporting. This obfuscation consisted of false reports being longer and using larger words to simulate authenticity and complexity. In turn, compared to truthful reports, fake reports are typically less readable.²³ Other studies across cultures have tested this idea and found support for the general contention that deceptive financial documents tend to be less readable than genuine documents.²⁴ With the hope of hiding poor financial news, fraudulent reports are obfuscated and strategically manipulated.

The goals of a predatory publisher or financial firm are analogous. In both domains, publishers and corporate executives are attempting to present themselves positively, hide illicit or inauthentic practices, and attract future authors or investors. We predict that the information on predatory publisher websites will be obfuscated more than authentic journal websites, which has been supported by the literature from consumer behavior.²²⁻²⁴ With more obfuscation, we assert that text from predatory publishers' websites will be less readable compared to that of authentic journals.

Hypothesis 3: Relative to the content on authentic publishers' websites, the content on predatory publishers' websites will be less readable.

Context: Genre Conventions

The third component of context relates to the genre conventions of science writing. We predict that science-related insight terms (e.g., consider, determine, solve) and causal terms (e.g., depend, solve) should be found more often in predatory journal websites in an attempt to sound more authentic or as believable compared to established journals. Additionally, we examine discrepancies (e.g., should, would), which are modal verbs commonly used in deceptive discourse to provide information about actions.⁹ These words help to prevent a speaker from providing a definitive answer about whether an action occurred (e.g., it "could" have occurred, or "should" have occurred). Often, deceptive speech is associated with an increase in discrepancies and we predict that predatory journals will use more of these words compared to authentic counterparts.

Hypothesis 4: Relative to authentic publishers, predatory publishers will use more insight terms, causal terms, and discrepancies.

The aforementioned hypotheses are grounded in literature from the social sciences and consumer behavior. By contextualizing these language parameters, we provide a focus to understand how psychological dynamics, pragmatic goals, and genre conventions play into a predatory journal's intent to deceive. Next, we outline our research methodology followed by our

empirical findings.

Method

Data collection

Two hundred twenty-four predatory journals were captured from Beall's list¹ on August 10, 2013. Out of this number, 203 had working websites and constitute the predatory corpus for our analysis. Each predatory journal website was visited and text from the About Us and Aim/Scope sections were placed into a word-processing document. Only these sections were gathered, because they are similar in content and structure across predatory and authentic journals. We were interested in the descriptions that predatory and authentic journals use to solicit manuscripts. These sections allowed us to understand how the two journal types identify themselves and market to academics.

To form the authentic corpus, the top 203 journals with the highest impact factor from Web of Science²⁵ in 2012 were gathered. This method was chosen as the Web of Science does not index predatory journals. For the list of journals in the predatory and authentic corpora, please see the Appendix. In sum, we used a balanced research design comparing predatory and authentic writing style of the About Us and Aim/Scope sections of these publishers' websites.

Language Analysis

To quantify language patterns, the automated language analysis tool Linguistic Inquiry and Word Count (LIWC) was used.²⁶ LIWC operates on a word count system, where it takes an input text and compares each word to its internal dictionary of 81 categories that were created by human judges. These categories tap basic elements of cognitive, health, and emotional psychology, and this program has been empirically validated across a variety of psycholinguistics studies.¹⁶ LIWC does not consider nouns in its dictionary because these words are subjective and contextualized. Rather, LIWC is best suited for collecting small, uncontrollable words (e.g., function words, articles, quantifiers) and relating them to the psychology of what is being considered (i.e., deception).

All of the language parameters were used as the standard LIWC dictionary categories except readability. In this analysis, a readability index was created by adding the standardized LIWC values of six letter words and words per sentence, then subtracting the dictionary category. The LIWC dictionary category is an overall measure of how many words from the input text were found in the LIWC database. Words outside of the dictionary are considered to be content-oriented. As mentioned, six letter words and words per sentence are indicators of linguistic complexity and longer words and sentences indicate greater obfuscation. Using the density score, readability is calculated by: $-1 * \text{Density} + 3$. A higher readability score on this index means that the text is easier to read.

Results

For a list of our statistical abbreviations and their explanations, please see Table 1.

Table 1. *Terminology Used in Analyses*

<u>Abbreviation</u>	<u>Explanation</u>
p	This is a probability statistic, < .05 is considered statistically significant.
F	This is a statistical test used to derive the p-value in our analysis.
M	Sample Mean, or average
SE	Sample Standard Error, or the estimated standard deviation.

We incorporated the eleven language dimensions from our hypotheses into a Multivariate Analysis of Variance (MANOVA). The model revealed a significant difference between predatory and authentic journal websites, $F(11,394)=10.34$, $p<.001$.

Psychological Dynamics

Partially supporting Hypothesis 1, predatory journals used more positive emotions ($M=2.51$, $SE=0.11$), than authentic journals ($M=2.10$, $SE=0.11$), $p=.006$, but there was only a marginally significant difference between overall affect language ($p=.064$) and the use of negative emotions ($p=.077$), with predatory journals using fewer negative emotions than authentic journals. Taken together, these results suggest that predatory journals use positive emotions to accomplish their goal of “selling” the publication, but the corpora were not substantially different in levels of overall affect and negativity.

Hypothesis 2 predicted that predatory journal websites would be less linguistically complex compared to authentic journals as a result of reduced function words, articles, prepositions, and quantifiers. This hypothesis was supported. Compared to authentic journal websites ($M=36.74$, $SE=0.52$), predatory journal websites contained fewer function words ($M=32.88$, $SE=0.52$), $p<.001$. Predatory journals ($M=5.75$, $SE=0.17$) also used fewer articles than authentic journals ($M=6.95$, $SE=0.17$), $p<.001$. Predatory journals ($M=11.99$, $SE=0.25$) used fewer prepositions than authentic journals ($M=14.83$, $SE=0.25$), $p<.001$. Finally, quantifiers were also used less often by predatory journals ($M=2.05$, $SE=0.10$) compared to authentic journals ($M=2.44$, $SE=0.10$), $p=.005$. Support for this hypothesis suggests that predatory journal website text is less linguistically complex and detailed than authentic journal text, consistent with the deception literature. The difficulty people experience constructing a lie is reflected in their language and this has been reflected in the three reduced complexity and one detailed information parameter outlined above.

Pragmatic Goals

Our third hypothesis proposed that text from predatory journal websites would be less readable compared to authentic journal text. We argued that similar to fraudulent financial reporting, predatory journals would try to overcompensate for their lack of authenticity by using longer sentences and larger words overall. These factors played into the readability index that was created using LIWC variables. Our results support Hypothesis 3, as predatory journal text was less readable ($M=2.74$, $SE=0.15$) than authentic journal text ($M=3.26$, $SE=0.15$), $p=.015$. This finding is consistent with the linguistic obfuscation hypothesis and we have extended its applicability to science writing. With more obfuscated writing styles, predatory journals are able to hide their deceptive intent and embellished text gives the appearance of an experienced and reputable journal.

Genre Conventions

Our final prediction relates to the language features reflecting the science genre. Hypothesis 4 was partially supported as well. Insight terms did not differ significantly between the two corpora ($p=.158$). Contrary to our prediction, causal terms were used less often by predatory journals ($M=1.08$, $SE=0.08$) compared to authentic journals ($M=1.57$, $SE=0.08$), $p<.001$. Our other prediction was supported, however. Discrepancies were used more often by predatory journals ($M=0.52$, $SE=0.05$) compared to authentic journals ($M=0.34$, $SE=0.05$), $p=.014$. Please see Table 2 for an outline of all language features, examples, and results from the MANOVA.

Table 2.

Linguistic Features Comparing Predatory and Authentic Text

Psychological Dynamics	Examples	Predatory		Authentic		F-value	p-value
		Mean	SE	Mean	SE		
affect terms	agree, thrive	2.77	0.12	2.47	0.12	3.46	.064
positive	accept, grand	2.51	0.11	2.10	0.11	7.53	.006
negative	forbid, suffer	0.25	0.04	0.35	0.04	3.14	.077
function words	let, it	32.88	0.52	36.74	0.52	27.55	<.001
articles	an, the	5.75	0.17	6.95	0.17	24.97	<.001
prepositions	about, during	11.99	0.25	14.83	0.25	63.18	<.001
quantifiers	less, more	2.05	0.10	2.44	0.10	8.03	.005
Pragmatic Goals							
readability		2.74	0.15	3.26	0.15	6.02	.015
Genre Conventions							
insight terms	believe, reason	2.21	0.10	2.00	0.10	2.00	.158
causal terms	control, effect	1.08	0.08	1.57	0.08	21.27	<.001
discrepancies	could, should	0.52	0.05	0.34	0.05	6.03	.014

Meta-Linguistic Cues of Deception

Aside from the language parameters of interest, we identified several cues of deception when surveying the predatory and authentic corpora. First, the “Contact Us” page on predatory sites may list third-party email addresses (e.g., Gmail) instead of .edu emails affiliated with colleges and universities. The editorial board section of predatory websites also tends not to provide email addresses and institutional affiliations of board members. Reputable scientists may be listed as board members without their consent, which is another attempt by predatory journals to feign authenticity. Additionally, a predatory site’s “indexing” page typically lists databases such as Google Scholar and CrossRef, which harvest a variety of materials and journal articles. While useful, these sources are not selective and do not screen for top tier journals.

Another important indicator of a predatory publisher is a suspicious journal impact factor. These numbers may be inflated and should be verified in authentic publishing databases such as

Web of Science²⁵ and Eigenfactor. We also found that predatory journals seem to promise unrealistic turn-around for peer-review. Promises for rapid review (i.e., one week) usually suggest that no review will take place and authors are not likely to receive comments or manuscript corrections. Authentic publishers expect a review will take much longer for reviewers to provide quality reports (i.e. BioMed Central lists two months), We noticed that the “Aim/Scope/Mission” of predatory journals tend to be incredibly broad and the content bridges unrelated domains. Journals with titles such as “International Research Journal of Humanities, Engineering, and Pharmaceutical Sciences” and “World Journal of Science and Technology” are much broader than most authentic journals. Broad research aims, unless the journal is of the General Interest category, may suggest that the publisher wants to accept as many papers and receive as many publication fees as possible.

It is important to note that predatory journals also make profits by publishing plagiarized articles and stealing identities of journals and conferences. Beall’s blog reports on a 2006 article in Elsevier’s *Geoderma* that was plagiarized 3 times by other authors.¹⁴ Journal hijacking also occurs, which is when an authentic journal’s identity is copied and presented as a bogus online version. This prevents article submissions from reaching the authentic journal. We mentioned the Journal of Cloud Computing as an example of journal hijacking; there are other practices such as minor spelling or grammatical changes to journal titles that should be documented as predatory. For example, Stringer Open at <http://www.stringeropen.com> mimics the authentic publisher Springer (<http://www.springeropen.com>).

The information from our meta-linguistic analysis highlights salient problems in the publishing world. There are many authors competing to publish in a finite number of well-known journals, which have limited space and high standards for peer-review. Unfortunately, predatory publishers exploit this high demand with a primary goal of generating profit over academic scholarship.

Discussion

We present the first empirical work on writing style differences between predatory and authentic journal websites. Our analyses support trends in the literature including a decrease in linguistic complexity and detailed information (i.e., fewer function words, articles, prepositions, and quantifiers)^{9-13,17,21} and the increased use of positive emotions¹¹ in text describing predatory journals. By measuring readability differences, we also found that predatory journal text was less readable than authentic journal text, consistent with the linguistic obfuscation hypothesis from the consumer behavior literature. The observation of obfuscation with predatory journals extends this hypothesis to the domain of publishing. We also considered language parameters specific to the science genre. Discrepancies (e.g., should, would) were more prevalent on predatory websites compared to authentic sites, which is consistent with findings in the deception literature.⁹ The meta-linguistic indicators went beyond word patterns to suggest additional features of predatory publishing that go along with Beall’s taxonomy. The use of third-party email addresses, promising rapid peer-review, providing fake impact factors, listing Google Scholar as an indexing database, and slightly altering a journal’s title signal suspicious publishing practices.

What do our results suggest for the deception literature and science publishing? This study supports the intuitions of many academics that predatory publishers are deceptive in trying to attract scholars. We have tested these intuitions by providing a systematic textual analysis with a novel theoretical focus: contextual features of psychological dynamics, pragmatic goals, and genre conventions. Our analyses suggest that while certain language features follow trends in the literature, some deception cues are distinct to the style of science writing. For example, contrary to most deception findings, predatory and authentic journal websites did not differ in the number of negative emotion terms. Upon further review, however, it seems logical that neither predatory nor authentic journals contained overwhelmingly negative sentiments. In order to attract academics who may want to publish in either journal, little negative affect should be expressed. Instead, we observed that predatory journals use significantly more positive emotions than authentic journals. We argue that this positive sentiment helps the predatory journals' "sell" academics on the seamless process and benefits of open-access publishing.

As current or future educators, it is important to recognize signals of deception in academic publishing because many admissions and tenure committees will discount publications that are accepted to journals that do not employ peer review.²⁷ Our language analysis provided a restricted but strong set of cues that reveal how predatory publishers strategically manipulate their audience into believing that their journal is authentic. This new information, along with more explicit deceptions explained in the meta-linguistic analysis and Beall's taxonomy, should help to inform researchers about writing style and presentational differences between predatory and authentic journals. In order to cull predatory journals from science, however, empiricism and policy should work together to notify academics about this issue and the standards to become a reputable publisher.

Classification Accuracy

In order to gauge how well our language features would predict the classification of a piece of text as predatory or authentic, we performed a statistical classification analysis. We entered the 11 language features from the MANOVA into a logistic regression. The model fit well, $\chi^2 = 107.11$, $p < .001$. With chance at 50% (203 predatory journals and 203 authentic journals), our predictive success reached a classification accuracy of 70.7%. This 20.7% increase above chance suggests that if text from another predatory or authentic journal website was entered into our model, it would be accurately classified as predatory or authentic 70.7% of the time. This improvement above chance shows the strength of our language predictors and the distinctiveness of predatory and authentic journal text.

Our language parameters yielded a highly predictive classification model, yet these data should not suggest that a forensic tool for the detection of predatory publishers is imminent. With 70% accuracy, approximately a third of journals would be misclassified. For such a forensic tool to be developed our results would need to be refined to improve accuracy and extended to other domains of science publishing. Additionally, the detection of predatory publishing would require more sophisticated natural language processing and machine learning techniques. We expect that our classification accuracy would improve with these methods. Our current model is purely a statistical projection based on the eleven parameters of interest.

Limitations and Future Directions

It is important to note that a potential covariate in our analysis is the length of time that a journal has been in circulation. We attempted to consider this measure for predatory and authentic journals, but this information was not always available online (for predatory journals, especially). It seems reasonable to suggest that the majority of authentic journals have been in circulation for a longer amount of time compared to predatory journals. Therefore, authentic journals may not need to provide as much information in the “About Us” or “Aim/Scope” sections because academics are aware of the journals’ scope and standards. While plausible, our results suggest the opposite explanation: predatory journals were less detailed (e.g., fewer quantifiers) and complex (e.g., fewer function words, articles, and prepositions) than authentic journals. While time in circulation could not be analyzed in our work due to data constraints, a more systematic review of this information would be beneficial to rule out alternative explanations. From these data, however, we suggest that not having information about the length of time in circulation could be another signal of predatory publishing for our meta-linguistic review.

A second potential limitation of our work is the lack of a direct control for journal content or area of study. Our meta-linguistic analysis noted that one signal of a predatory journal is its impractically wide scope. Our authentic corpus contained many General Interest journals (i.e., Science, Nature), but the predatory corpus contained journals such as the *International Journal of Engineering and Computer Science* that lists publishing areas ranging from Computer Science and Engineering to Communication. Future work should look to cluster the predatory journals into thematic areas based on content similarities, in order to determine if a particular area of research is more deceptive than others.

Additional research in this space should also try to understand the impact of publishing country on predatory versus authentic journal text. Our team looked into this issue, but many predatory journals do not provide their headquarters’ location. As most predatory journals are open-access and exist online only, perhaps these publishers believe that location is irrelevant. For our purposes, however, we were limited in our ability to understand where predatory journals mainly reside and if there is an influence of country on our analyses. Unfortunately, these data did not allow us to perform such an analysis.

Conclusion

This study presents real-world data on the influence of deception in academic publishing. Using automated text-analysis methods, we compared predatory and authentic journals across disciplines to understand how deception operates in this environment. By structuring our analyses on three elements of context – psychological dynamics, pragmatic goals, and genre conventions – we strategically chose eleven parameters of writing style for our investigation. Our meta-linguistic observations also provide an immediate take-away result for researchers who may become suspicious about a publisher. The review, along with existing information from Jeffrey Beall’s database, should help to examine questionable publishing practices in greater detail.

References

1. Beall, Jeffrey. "Scholarly Open Access List of Standalone Journals." <http://scholarlyoa.com/individual-journals/>.
2. Beall, Jeffrey. "Two Publishers Each Have A Journal With the Same Title." <http://scholarlyoa.com/2012/09/18/two-publishers-each-have-a-journal-with-the-same-title/>
3. Casadevall, Arturo, and Ferric C. Fang. "Reforming Science: Methodological and Cultural Reforms." *Infection and Immunity* 80, no. 3 (2012): 891-96.
4. Van Noorden, Richard. "The Trouble with Retractions." *Nature* 478 (2011): 26-28.
5. Fang, Ferric C., R. Grant Steen, and Arturo Casadevall. "Misconduct Accounts for the Majority of Retracted Scientific Publications." *Proceedings of the National Academy of Sciences of the United States of America* 109, no. 42 (2012): 228-33.
6. Fanelli, Daniele. "How Many Scientists Fabricate and Falsify Research? A Systematic Review and Meta-Analysis of Survey Data." *PloS One* 4, no. 5 (2009): 1-11.
7. Levelt, Noort, Drenth Committees. "Flawed science: The fraudulent research practices of social psychologist Diederik Stapel." <https://www.commissielevelt.nl>.
8. Yong, Ed. "Nobel Laureate Challenges Psychologists to Clean up Their Act." *Nature News* 3 October 2012. <http://www.nature.com/news/nobel-laureate-challenges-psychologists-to-clean-up-their-act-1.11535>.
9. Pennebaker, James W. *The Secret Life of Pronouns: What Our Words Say About Us*. London: Bloomsbury Press, 2011.
10. Hancock, Jeffrey T., Lauren E. Curry, Saurabh Goorha, and Michael Woodworth. "On Lying and Being Lied To: A Linguistic Analysis of Deception in Computer-Mediated Communication." *Discourse Processes* 45, no. 1 (2008): 1-23.
11. Ott, Myle, Yejin Choi, Claire Cardie, and Jeffrey T. Hancock. "Finding Deceptive Online Spam by Any Stretch of the Imagination." In *49th Annual Meeting of the Association for Computational Linguistics*, 309-19. Portland, Oregon, 2011.
12. Toma, Catalina, and Jeffrey T. Hancock. "What Lies Beneath: The Linguistic Traces of Deception in Online Dating Profiles." *Journal of Communication* 62 (2012): 78-97.
13. Vrij, Aldert. *Detecting Lies and Deceit: Pitfalls and Opportunities*. 2nd ed. West Sussex: John Wiley & Sons Ltd., 2008.
14. Beall, Jeffrey. "2006 Article Plagiarized Three Times in Predatory Journals." In *Scholarly Open Access*, edited by Jeffrey Beall, 2012.
15. Beall, Jeffrey. "Criteria for Determining Predatory Open-Access Publishers." scholarlyoa.com/2012/11/30/criteria-for-determining-predatory-open-access-publishers-2nd-edition/, 2012.
16. Tausczik, Yia R., and James W. Pennebaker. "The Psychological Meaning of Words: LIWC and Computerized Text Analysis Methods." *Journal of Language and Social Psychology* 29, no. 1 (2010): 24-54.
17. Newman, Matthew L., James W. Pennebaker, Diane S. Berry, and Jane M. Richards. "Lying Words: Predicting Deception from Linguistic Styles." *Personality and Social Psychology Bulletin* 29, no. 5 (2003): 665-75.
18. Hancock, Jeffrey T., and Amy Gonzalez. "Deception in CMC." In *Pragmatics of Computer-Mediated Communication*, edited by Susan Herring, Dieter Stein and Tuija Virtanen, 736. Berlin, Germany: Mouton de Gruyter, 2012.
19. Markowitz, David M., Jeffrey T. Hancock, and Natalya Bazarova. "The Language of Presidential Lies: How Words Can Reflect Lies About War, Personal Scandal, and State Secrets." In *97th Annual Meeting of the National Communication Association*. New Orleans, LA, 2011.
20. DePaulo, Bella M., Brian E. Malone, James J. Lindsay, Laura Muhlenbruck, Kelly Charlton, and Harris Cooper. "Cues to Deception." *Psychological Bulletin* 129, no. 1 (2003): 74-118.
21. Chung, Cindy, and James W. Pennebaker. "The Psychological Functions of Function Words." Chap. 12 In *Social Communication*, edited by K. Fiedler, 343-59. New York: Psychology Press, 2007.
22. Courtis, John K. "Annual Report Readability Variability: Tests of the Obfuscation Hypothesis." [In English]. *Accounting, Auditing & Accountability Journal* 11, no. 4 (1998): 459.
23. Humphreys, Sean L., Kevin C. Moffitt, Mary B. Burns, Judee K. Burgoon, and William F. Felix. "Identification of Fraudulent Financial Statements Using Linguistic Credibility Analysis." *Decision Support Systems* 50 (2011): 585-94.

24. Othman, Intan Waheedah, Hazlina Hasan, Roszana Tapsir, Norhafizah Abdul Rahman, Indarawati Tarmuji, Suria Majdi, Seri Ayu Masuri, and Normah Omar. "Text Readability and Fraud Detection." Paper presented at the Business, Engineering and Industrial Applications (ISBEIA), 2012 IEEE Symposium on, 23-26 Sept. 2012.
25. Web of Science. "Journal Citation Reports." Thomson Reuters, http://wokinfo.com/products_tools/analytical/jcr/.
26. Pennebaker, James W., Booth, Richard. J., & Martha E. Francis. Linguistic inquiry and word count. Austin. www.liwc.net. (2007).
27. Stratford, Michael. "Predatory Online Journals Lure Scholars Who Are Eager to Publish." *The Chronicle of Higher Education* (2012). Published electronically March 4, 2012.

Appendix.

Evaluated List of 203 Predatory and 203 Authentic Journals

Predatory Journal Titles from Beall's List¹	Authentic Journal Abbreviations from Web of Science²⁵ Top Journals with Highest Impact Factor
Academic Exchange Quarterly	ACCOUNTS CHEM RES
American Journal of Engineering Research	ACS NANO
American Journal of PharmTech Research (AJPTR)	ACTA CRYSTALLOGR D
American Journal of Phytomedicine and Clinical Therapeutics	ACTA NEUROPATHOL
American Journal of Social issues and Humanities	ADV APPL MECH
American Research Journal	ADV DRUG DELIVER REV
Arab World English Journal (AWEJ)	ADV ENERGY MATER
Archives Des Sciences Journal	ADV FUNCT MATER
Archives of Pharmacy Practice	ADV MATER
Asian Journal of Biomedical and Pharmaceutical Sciences	ADV PHYS
Asian Journal of Health and Medical Sciences	ALZHEIMERS DEMENT
Asian Journal of Humanities and Social Sciences	AM J HUM GENET
Asian Journal of Business and Management Sciences (AJBMS)	AM J PSYCHIAT
Asian Journal of Pharmaceutical and Health Sciences	AM J RESP CRIT CARE
Asian Journal of Pharmacy and Life Science	ANGEW CHEM INT EDIT
Asian Journal of Pharmaceutical Research and Health Care (AJPRHC)	ANN INTERN MED
Australasian Journal of Herpetology	ANN NEUROL
Australian Journal of Business and Management Research (AJBMR)	ANN RHEUM DIS
Ayupharm: International Journal of Ayurveda and Allied Sciences	ANNU REV ANAL CHEM
Biosciences, Biotechnology Research Asia (BBRA)	ANNU REV ASTRON ASTR
British Journal of Economics, Finance and Management Sciences	ANNU REV BIOCHEM
British Journal of Science	ANNU REV BIOMED ENG
Bulletin of Mathematical Sciences & Applications	ANNU REV BIOPHYS
Canadian Chemical Transactions	ANNU REV CELL DEV BI
Case Studies Journals	ANNU REV CLIN PSYCHO
Computer Science Journal	ANNU REV CONDEN MA P
Current Discovery	ANNU REV EARTH PL SC

Direct Research Journals	ANNU REV ECOL EVOL S
ExcelingTech Publishing Company, Ltd.	ANNU REV ENTOMOL
Elixir International Journal (formerly Elixir Online Journal)	ANNU REV FLUID MECH
Global Journal of Management Science and Technology	ANNU REV GENET
Global Journal of Medicine and Public Health	ANNU REV GENOM HUM G
Golden Research Thoughts	ANNU REV IMMUNOL
Indian Journal of Research Anvikshiki	ANNU REV MAR SCI
Indian Journal of Scientific Research	ANNU REV MATER RES
Indian Streams Research Journal	ANNU REV MED
Indo-Global Journal of Pharmaceutical Sciences	ANNU REV MICROBIOL
Innovations in Pharmaceuticals and Pharmacotherapy (IPP)	ANNU REV NEUROSCI
Interdisciplinary Journal of Contemporary Research in Business	ANNU REV NUTR
Interdisciplinary Journal of Research in Business (IDJRB)	ANNU REV PATHOL-MECH
International Ayurvedic Medical Journal (IAMJ)	ANNU REV PHARMACOL
International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE)	ANNU REV PHYS CHEM
International Journal of Advanced Research in Computer Science and Software Engineering (IJARCSSE)	ANNU REV PHYSIOL
International Journal of Advanced Technology and Engineering Research (IJATER)	ANNU REV PHYTOPATHOL
International Journal of Advances in Engineering & Technology (IJAET)	ANNU REV PLANT BIOL
International Journal of Agriculture and Crop Sciences (IJACS)	ANNU REV PSYCHOL
International Journal of Agricultural Management & Development	ARCH GEN PSYCHIAT
An International Journal of Agricultural Technology (IJAT)	ASTRON ASTROPHYS REV
International Journal of Agronomy & Plant Production	ASTROPHYS J SUPPL S
International Journal of Applied Biology and Pharmaceutical Technology(IJABPT)	AUTOPHAGY
International Journal of Applied Linguistics & English Literature	BBA-REV CANCER
International Journal of Applied Research & Studies (iJARS)	BEHAV BRAIN SCI
International Journal of Artificial Intelligence and Mechatronics	BIOL PSYCHIAT

International Journal of Bio (IJOBIO)	BIOL REV
International Journal of Biomedical Science	BIOTECHNOL ADV
International Journal of Business and Commerce	BLOOD
International Journal of Bussiness and Management Invention	BRAIN
International Journal of Business and Social Research	BRIT MED J
International Journal of Computational Engineering Research	CA-CANCER J CLIN
International Journal of Computer & Electronics Research (IJCER)	CANCER CELL
International Journal of Computer and Information Technology (IJCIT)	CANCER RES
International Journal of Computer Applications	CELL
International Journal of Computer Application and Engineering Technology (IJCAET)	CELL HOST MICROBE
International Journal of Computer Applications in Engineering Sciences(IJCAES)	CELL METAB
International Journal of Computer Science and Information Security	CELL RES
International Journal of Computer Science and Network (IJCSN)	CELL STEM CELL
International Journal of Computer Science and Network Security(IJCSNS)	CHEM REV
International Journal of Computer Science Engineering (IJCSE)	CHEM SOC REV
International Journal of Computer Science Issues	CIRC RES
International Journal of Current Research	CIRCULATION
International Journal of Current Research and Review	CLIN INFECT DIS
International Journal of Development and Sustainability (IJDS)	CLIN MICROBIOL REV
International Journal of Development Research	COORDIN CHEM REV
International Journal of Drug Development and Research (IJDDR)	CSH PERSPECT BIOL
International Journal of E-Computer Science Evolution	CURR BIOL
International Journal of Economics and Research	CURR OPIN CELL BIOL
The International Journal of Educational and Psychological Assessment	CURR OPIN CHEM BIOL
International Journal of Electrochemical Science	CURR OPIN IMMUNOL

International Journal of Electronics Communication and Computer Engineering	CURR OPIN STRUC BIOL
International Journal of Electronics Communication and Computer Technology (IJECCT)	CYTOKINE GROWTH F R
International Journal of Emerging Sciences (IJES)	DEV CELL
International Journal of Emerging Technology and Advanced Engineering	DRUG RESIST UPDATE
International Journal of Energy & Technology	ECOL LETT
International Journal of Engineering and Advanced Technology (IJEAT)	EMBO J
International Journal of Engineering and Applied Sciences	ENDOCR REV
International Journal of Engineering and Computer Science (IJECS)	ENERG ENVIRON SCI
International Journal of Engineering and Innovative Technology (IJEIT)	EPIDEMIOL REV
International Journal of Engineering and Management Research(IJEMR)	EUR HEART J
The IJES: The International Journal of Engineering and Science	EUR UROL
International Journal of Engineering and Science Invention (IJESI)	FEMS MICROBIOL REV
International Journal of Engineering Inventions	GASTROENTEROLOGY
International Journal of Engineering Research and Applications	GENE DEV
International Journal of Engineering Research and Development(IJERD)	GENOME BIOL
International Journal of Engineering Research and Science & Technology (IJERST)	GENOME RES
International Journal of Engineering Science & Advanced Technology	GUT
International Journal of Engineering Science and Innovative Technology(IJESIT)	HEPATOLOGY
International Journal of Engineering, Science and Technology	HUM REPROD UPDATE
International Journal of Engineering Sciences & Research Technology(IJESRT)	IEEE ENG MED BIOL
International Journal of English Language & Translation Studies (IJ-ELTS)	IMMUNITY
International Journal of Farming and Allied Sciences	IMMUNOL REV
International Journal of Fundamental & Applied Sciences	ISME J
International Journal of Health Research	J ALLERGY CLIN IMMUN

International Journal of Humanities and Social Science Invention (IJHSSI)	J AM CHEM SOC
International Journal of Humanities, Engineering and Pharmaceutical Sciences	J AM COLL CARDIOL
International Journal of Information and Communication Technology Research	J CELL BIOL
International Journal of Information Technology & Business Management	J CLIN INVEST
International Journal of Innovative Ideas	J CLIN ONCOL
International Journal of Innovative Research and Development	J EXP MED
International Journal of Innovative Research and Studies	J HEPATOL
International Journal of Innovative Technology and Exploring Engineering (IJITEE)	JAMA-J AM MED ASSOC
International Journal of Inventions in Pharmaceutical Sciences (IJIPS)	JNCI-J NATL CANCER I
International Journal of Language Learning and Applied Linguistics World	LANCET
International Journal of Life science and Pharma Research	LANCET INFECT DIS
International Journal of Life Sciences Biotechnology and Pharma Research (IJLBPR)	LANCET NEUROL
The International Journal of Management	LANCET ONCOL
International Journal of Management and Business Studies (IJMBS)	LEUKEMIA
International Journal of Management Research and Business Strategy(IJMRBS)	LIVING REV RELATIV
International Journal of Management Sciences and Business Research(IJMSBR)	LIVING REV SOL PHYS
International Journal of Mathematics and Soft Computing (IJMSC)	MAT SCI ENG R
International Journal of Medical Science and Public Health (IJMSPH)	MED RES REV
International Journal of Medicine and Biomedical Research	MICROBIOL MOL BIOL R
International Journal of Medicine and Biosciences	MOL ASPECTS MED
International Journal of Modern Engineering Research (IJMER)	MOL BIOL EVOL
International Journal of Novel Drug Delivery Technology	MOL PSYCHIATR
International Journal of Pharma and Bio Sciences (IJPBS)	MOL SYST BIOL

International Journal of Pharmaceutical & Research Science (IJPRS Journal)	NANO LETT
International Journal of Pharmaceutical and Biomedical Research	NANO TODAY
International Journal of Pharmaceutical Science Invention (IJPSI)	NAT BIOTECHNOL
International Journal of Pharmaceutical Sciences and Drug Research	NAT CELL BIOL
International Journal of Pharmacy and Technology (IJPT)	NAT CHEM
International Journal of Plant, Animal and Environmental Sciences	NAT CHEM BIOL
International Journal of Recent Scientific Research	NAT CLIM CHANGE
International Journal of Recent Technology and Engineering (IJRTE)	NAT COMMUN
International Journal of Research and Innovation in Computer Engineering (IJRICE)	NAT GENET
International Journal of Research in Aeronautical and Mechanical Engineering (IJRAME)	NAT GEOSCI
International Journal of Research in Ayurveda and Pharmacy	NAT IMMUNOL
International Journal of Research in Computer Science	NAT MATER
International Journal of Research in Computer Technology	NAT MED
International Journal of Research in Engineering and Advanced Technology (IJREAT)	NAT METHODS
International Journal of Research in Engineering and Technology(IJRET)	NAT NANOTECHNOL
International Journal of Research in Medical and Dental Sciences	NAT NEUROSCI
International Journal of Reviews in Computing	NAT PHOTONICS
International Journal of Science and Advanced Technology (IJSAT)	NAT PHYS
International Journal of Science and Technology	NAT PROD REP
International Journal of Science Commerce and Humanities (IJSCH)	NAT REV CANCER
International Journal of Science Innovations and Discoveries	NAT REV CARDIOL
International Journal of Sciences (IJSciences)	NAT REV CLIN ONCOL
International Journal of Scientific & Engineering Research	NAT REV DRUG DISCOV
International Journal of Scientific & Technology Research	NAT REV ENDOCRINOL

International Journal of Scientific and Research Publications (IJSRP)	NAT REV GASTRO HEPAT
International Journal of Scientific Engineering and Technology	NAT REV GENET
International Journal of Scientific Research in Education	NAT REV IMMUNOL
The International Journal of Social Sciences (TIJOSS)	NAT REV MICROBIOL
International Journal of Soft Computing and Engineering	NAT REV MOL CELL BIO
International Journal of Sport Studies (IJSS)	NAT REV NEUROL
International Journal of Technical Research and Applications (IJTRA)	NAT REV NEUROSCI
International Journal of Trends in Economics Management and Technology (IJTEMT)	NAT REV RHEUMATOL
International Journal on Recent and Innovation Trends in Computing and Communication (IJRITCC)	NAT STRUCT MOL BIOL
International Refereed Journal of Engineering and Science (IRJES)	NATURE
International Research Journal of Applied Finance	NEURON
International Researchers	NEUROPSYCHOPHARMACOL
International Review of Social Sciences and Humanities	NEUROSCI BIOBEHAV R
Journal of Advances in Internal Medicine	NEW ENGL J MED
Journal of Animal and Plant Sciences (Nairobi, Kenya)	NPG ASIA MATER
Journal of Applied Pharmaceutical Science	P NATL ACAD SCI USA
Journal of Behavioral Sciences in Asia	PART FIBRE TOXICOL
Journal of Bio Innovation	PHARMACOL REV
Journal of Business Management and Applied Economics	PHYS REP
Journal of Business Research (İşletme Araştırmaları Dergisi)	PHYSIOL REV
Journal of Cosmology	PLANT CELL
Journal of Emerging Trends in Computing and Information Sciences	PLOS BIOL
Journal of Environmental Hydrology	PLOS MED
Journal of International Academic Research for Multidisciplinary (JIARM)	PROG ENERG COMBUST
Journal of International Management Studies	PROG LIPID RES
Journal of Knowledge Management, Economics and Information Technology	PROG MATER SCI
Journal of Medical Research and Practice (JMRP)	PROG NEUROBIOL

Journal of Pharmaceutical and Biomedical Sciences (JPBMS)	PROG POLYM SCI
Journal of Scientific Theory and Methods	PROG QUANT ELECTRON
Kashmir Economic Review	PROG RETIN EYE RES
Mathematical and Computational Applications (MCA)	PSYCHOL BULL
Open Veterinary Journal	PSYCHOL REV
Oriental Journal of Chemistry	Q REV BIOPHYS
Oriental Journal of Computer Science and Technology	REP PROG PHYS
Oxidants and Antioxidants in Medical Science	REV GEOPHYS
People's Journal of Scientific Research	REV MOD PHYS
The Pharma Research (Journal)	SCI TRANSL MED
Pharmacologia	SCIENCE
PHARMANEST: An International Journal of Advances in Pharmaceutical Sciences	SLEEP MED REV
Plant Digest	SURF SCI REP
Research Inventy: International Journal of Engineering and Science	SYST BIOL
Research Journal of Pharmaceutical, Biological and Chemical Sciences(RJPBCS)	TRENDS BIOCHEM SCI
Researchers World – Journal of Arts Science & Commerce	TRENDS BIOTECHNOL
Review of Research	TRENDS CELL BIOL
Reviews of Progress	TRENDS COGN SCI
Science International	TRENDS ECOL EVOL
Science Reuters	TRENDS ENDOCRIN MET
Scientific World	TRENDS GENET
Seventh Sense Research Group Journal	TRENDS IMMUNOL
South Asian Journal of Mathematics	TRENDS MOL MED
Tactful Management Research Journal (TMRJ)	TRENDS NEUROSCI
Universal Journal of Computer Science and Engineering Technology (UniCSE)	TRENDS PHARMACOL SCI
World Applied Sciences Journal	TRENDS PLANT SCI
World Journal of Science and Technology (WJST)	WORLD PSYCHIATRY