

# Predatory Publishing: A Quantitative Assessment, the Predatory Score

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## ABSTRACT

Predatory publishing is a relatively new concept but for which few industry standards and regulations have been implemented, either due to regulatory limitations or due to difficulties in dealing with the political correctness and sensitivity of these issues, particularly among main-stream publishing houses and the wider scientific community. However, with a growing expansion of and reliance on the internet, with a deepening economic global crisis, those who seek to take the road of deceit is increasing, not only to secure power, but to also amalgamate wealth, through whatever means they feel fit. Within this volatile toxic climate of human survival, and the lack of transparency and of independent regulatory watchdogs, online publishing, specifically open access publishing, has taken a nasty turn. This paper does not examine what predatory publishing is, because the root causes are multiple, and complex, but attempts to create some concrete definitions and quantitative measurements that would allow the scientific community to better guide and protect itself from abuse. In this paper, I attempt to quantify those factors that are negative and those that are positive, and have assigned arbitrary values based on a relative weighting system, the Predatory Score (PS). With this first quantitative system – which in itself is in no way perfect – to assess predatory publishing, authors will be able to better assess a publisher before submission, publishers will be able to better assess themselves regarding their own practices (with the objective of lowering their PS and improving their service record, and any person or institute associated with a publisher would be able to assess the academic and structural qualities (weaknesses and strengths) of that publisher. Based on the PS, individuals within the academic community will be better able to – freely and independently – make more value-based decisions regarding publishing. A useful glossary of ecologically-based terms adapted to describe predatory publishing is also provided to assist in the future description of predatory publishers.

**Keywords:** ecology, peer review, predatory publishing, profit, victimization, web-site

**Abbreviations:** APA, anti-predatory adaptation; COI, conflict(s) of interest; EiC, editor-in-chief; OA, open access; PF, predatory factor; PR, peer reviewer; PS, predatory score; PS<sub>RAW</sub>, raw value of PS as calculated using parameters in Table 1 of this paper; PS<sub>VER</sub>, an adjusted PS<sub>RAW</sub> value after the “supposed predatory publisher” has been contacted about, and has had an opportunity to respond to, the parameters in Table 1 of this paper; RW, relative weighting; VER, the verification factor; VSPF, very serious predatory factor

## WHAT IS PREDATION? CAN A COMPARISON BE DRAWN BETWEEN ECOLOGY AND PUBLISHING? A GLOSSARY OF USEFUL AND APPLICABLE TERMS.

In order to define the terms predator, predatory, prey and predation, it is useful, no doubt, to turn to basic ecology – from where the term most likely originally derives – to explain the terms, which are central to this paper and to the concept as appears in papers and blogs and to draw a parallel between these terms or concepts in ecology and in publishing. The terms are broad terms as used in ecology, but the author has used his own imagination to adapt them to the topic at hand. These terms are new, but will be useful, in the future, when used to describe predatory publishing practices using *neo*-jargon rather than the use of adjectives that might be perceived as being insinuating, insulting, or perjorative. Terms are listed alphabetically.

**Anti-predatory adaptations:** This is not necessarily the same as defense, which usually involves an active, physical counter-measure against the actual act of predation. Anti-predatory adaptations or APAs (some ideas inspired from Wikipedia) would involve changes to behaviour that would either mislead, confuse, or ultimately discourage a predator from making the kill or targeting the prey. Aggressive APAs would involve physical or chemical means to ward off a predator. Clustering or mobbing would involve the concerted effort by several would-be predators to join forces with the objective of warding off a predator through

a show of force, through numbers. APAs could include discouragement, which would involve the use of a technique by prey that would not attract or be attractive to a predator, or aposematism, which would involve the use of bright colours to ward off predators. Colours could be figuratively interpreted as actions or physical means within the publishing context.

**Attack, defense and hunt:** A predator usually has several tools to take benefit from the prey, or to kill it. Occasionally, prey also has its own adaptive defense mechanisms, which it either evolved over time, or which it inherently holds. The combination of these equals the active process by which the prey attempts to avoid the predator, but in which the predator uses its ability and prowess to capture the prey, i.e., in a process termed the hunt.

**Behaviour:** the response of a prey or predator to another prey or predator. This can be physical, emotional, or psychological.

**Biological control:** the use of a predator to control another predator.

**Camouflage:** a smart system used by the predator to disguise itself among its surroundings in order to confuse, and thus catch, the prey. In publishing, this could involve a number of methods to “fool” or manipulate the scientist into thinking that that publisher is not what it appears to be, usually hiding among other publishers using tricky colours,

shapes or sounds to mask its presence or to confuse its potential prey.

**Capacity:** when a relative maximum level of consumption has been reached, i.e. where a maximum stock of prey exists and cannot expand more, this would be capacity. Capacity can never be exceeded without dangerous and negative consequences for the surroundings, in this case, the publishing community. Thus, when prey or predator capacity is exceeded, one or the other have the potential of dying off.

**Competition:** the battle among organisms, usually within the same trophic level, for the same type of organisms (or resources) in the trophic level below it.

**Conservation:** the unnatural antithesis of extinction. A state of co-existence of prey and predators propped up artificially, independent of the final goal.

**Cost-benefit relationship and reward:** Prey never wants to be predated upon, needless to say, so it has absolutely no benefits. The predator, however, always seeks a higher or better state of being when hunting prey, but always for survival, at minimum. This benefit could be physically, emotionally, financially, sexually, or other expressions of benefits received exclusively to further its own (almost always selfish) needs. In publishing terms, for an academic society, the ultimate reward is academic, and fame, while for a for-profit publisher, this could amount to higher profits, enhanced management bonuses and better stock prices to satisfy investors.

**Entrapment:** the method by which the predator catches its prey, which is usually unsuspecting of the method, or sometimes even oblivious of the existence (or presence or motivation) of the predator.

**Evolution:** the ability to adjust, change and thus survive. The term could be used for both the predator to change and improve its methods of predation to ensure survival and propagation of its species, or by the prey, often through a process of learning, how to avoid predators, or to minimize the risk of being predated upon. Most likely both processes will always be taking place in parallel, although the balance may be very distorted.

**Extinction:** Excessive competition can cause the total eradication or disappearance of either prey or predator. Thus, excessive consumption of prey can lead to the extinction of prey while smart evolutionary adaptation by prey can lead to the extinction of a predator. If the predator is unable to adapt, then if the prey becomes extinct, it too will become extinct, i.e., co-extinction.

**Fear factor:** an unconscious state of mind that develops within the prey's mind about an area where the risk of being predated is greater than in other foraging areas.

**Fecundity (fertility):** the ability (or not) of prey or a predator to reproduce.

**Hunger and greed:** the basic instinct that triggers a predatory action. While hunger will usually lead to the predation of just enough to satisfy a basic need, greed will exceed the natural limits for the requirements of survival.

**Mimicry:** a smart method, different to camouflage, to disguise itself for the purpose of capturing prey. By following the behaviour of another larger or more dangerous predator, an almost innocent or weak predator can become a more dangerous predator, simply by copying the methods of predation, or any aspect of a pure predator, to get game. It is also a way for prey to copy the appearance of another organism or object, to avoid being predated. Mimicry can

be offensive or defensive (predator and prey, respectively).

**Polyphenism (or defense):** According to Gilbert (2010), "Many organisms are able to change their morphology and/or behavior in response to the threat of predation. The phenotypic alteration by modulating developmental processes in the presence of predators is called "predator-induced defense" or "predator-induced polyphenism", and these modifications can increase the fitness of prey organisms".

**Predation:** the action by which one organism (or party) is eaten (or predated upon) by another. In publishing, this would refer to the one-sided "consumption" of a relationship between publisher and author which, in the worst case scenario, would result in the "death" of the author. It is rare (perhaps even unheard of) to see the predation of a publisher by authors, reinforcing the notion that in the world of publishing the predator will almost inevitably be the publisher.

**Predator:** the organism (or party) that predated upon another, or upon prey. In the context of this paper, it is the publisher. Usually, in ecology, young, weak or unhealthy individuals are selected against, but since the scope of authorship is so broad in publishing, it could extend easily to include any individual (i.e., author), independent of their state of health or development, simply because the range of predators and the styles of predation in publishing are adapting and evolving constantly to meet the demands of authors to give the appearance of being mutualistic, i.e., *pseudo-mutualistic*.

**Prey (or game):** the organism (or party) that is predated upon, i.e., the victim. The author, or, for the purposes of the scientific audience, the scientist. In most cases the prey incurs a loss, in the extreme case being death and total consumption by the predator. But there are clearly a range of levels of predation.

**Predatory:** an adjective to describe the nature of the predator.

**Scavenging:** When predator capacity is exceeded, predators also die off from the inability to catch prey, or begin to predate upon other predators (much to the delight of the prey who is no longer the target), i.e., the shark-eat-shark analogy (giving the prey a greater chance of survival due to the distraction of the predator). It is a desperate measure of survival and usually the last recourse before death or the commitment to a constantly poorly nutritional state of life having to always settle for less than that is desired for optimal survival.

**Selective pressure:** a pressure that is usually imposed by external forces that would lead to the dynamic between a predator and its prey. In the context of publishing, this could be the turn towards open access (OA), limited publishing funds, restricted data sets, narrower field of study, etc. Usually, these factors can be both dependent or independent of the state of the scientist/author.

**Size restriction:** Not all potential prey is actual prey and actual size limits exist to what a predator can hunt and gather. The prey pool is limited and, where the number of predators increases, so too does the competition between them.

**Surplus:** unlike capacity, which would usually indicate the lower level of a stock, surplus would indicate an abundance of, or excess, stock. Thus, when there is more than ample prey, it is termed surplus.

**Trophism:** the natural order of organisms that becomes established in the food/feeding chain or pyramid. Usually,

an organism from a lower trophic level will rarely, if ever, feed upon an organism at a higher level. Lower level organisms, are, by nature, predated upon. The energetic needs to maintain higher trophic levels requires an ever increasing amount of energy dependence and predation upon lower trophic level organisms to sustain life and to survive. In some ways, it is an artificially imposed state and is thus not realistically sustainable.

Predators can be ranked according to their depth of interaction with the prey and amount of damage that is inflicted upon the prey by the predator.

- 1) Pure predator: the prey dies, usually with no escape. In publishing, this would correspond to a lost manuscript, a negatively scarred CV (*curriculum vitae*, i.e., résumé), or a damaged career as a result of the actions by or associations with the predatory publisher. Thus, the ecological concept of death is not applicable to predatory publishing, but rather signifies loss. The method to achieve predation will be exemplified through a quantitative system below although limited parallels will be drawn with wild natural ecological predation since comparisons might become too hyperbolic, e.g. using the terms devouring, poison, digestion, dismembering, etc. Although such terms would certainly make the description more colourful and realistic, it would certainly distract the reader and perhaps cast an incorrect notion about what takes place in predation in publishing. Thus, only basic categories and explanations will be used here.
- 2) Parasitism: the parasite (predatory publisher) will usually take more benefit from the host (author), usually resulting in total benefit for the predator. The relationship is heavily skewed, and usually the health of the prey deteriorates, leading ultimately to death, figuratively, of course, but usually in serious loss or damage for the author, most usually through a loss of finances, energy, effort and time.
- 3) Opportunism: the predator will adapt its predatory methods to adjust or adapt to a changing prey population and will settle for preying a wider scope of prey than it usually would if the usual prey were abundant. In other words, it would settle for less so as not to lose the opportunism gained from the prey rather than risk losing the prey altogether. In publishing, this could be interpreted as a publisher who would predate upon a select academic category or field of study vs one that would branch out into numerous, non-specialist fields of study in order to trap the prey. It could also be extrapolated to interpret the lowering of standards to satisfy a wider audience. Since the basis of such practices is deceitful, it is thus predatory.
- 4) Mutualism: although scientists might be divided as to whether this term could be considered to be a form of predation, in my own interpretation, benefit is being derived, although in a 50:50 relationship (bi-lateral benefit), from the other party, resulting in the survival of both parties. Some aspects of the dynamic of the relationship could be considered to be predatory even though, overall, no harm is done to one side or the other. Overall, both parties gain benefit, so the negative aspects tend to be unseen, subtle, or silenced. Although there are negative aspects that can be damaging (or predatory), these are often overlooked, or masked. This form of predation is most difficult to differentiate and identify.

## A QUANTITATIVE SYSTEM TO MEASURE AND QUALIFY PREDATORY PUBLISHING

Several assumptions and basal ideas have been used to develop the categorization in **Table 1**:

- a) In publishing, the classification of predatory can be based on many aspects (for example price, editorial quality, web-site structure, design and functionality;

- b) publishing practices and procedure; technology used; communication; quality control in ensuring academic standards, etc.). **Table 1** has explored as many factors as possible that the author believes to affect the quality of a publisher and thus the base of the social contract a publisher has with the scientific community and society.
- b) The scoring system is and never will be perfect, but it is relatively free from bias because it can be applied by anyone, and to anyone. Over time, it is the hope of the author of this paper that tweaks to the system can be made.
- c) Any interaction between author and publisher will always benefit the publisher but not always necessarily benefit the author. This might be a debatable issue, since the author will always gain a publication to fortify their CV, but at what cost, and under what conditions of quality control?
- d) There must always be a constant assumption, i.e., that there is a lack of trust (but not necessarily a total lack of trust) or transparency in the publishing process and that it is always subject to human and computer (technical) flaws, but always open for improvement. Such inherent error will always be a constant.
- e) No publisher is born experienced, or perfect. Neither is any author born knowledgeable, or aware of the risks posed by predators.
- f) It is often not easy to distinguish between a predatory practice and between poor quality.
- g) There are no neutral factors. Every factor, the predatory factor or PF, has a relative weighting (RW), which has been assigned a value from the perspective of the author, but always relative to every other PF. This is an attempt to avoid bias and subjectivity and because ranking would surely be too subjective and thus distort the PF system. PF values can either be positive, or negative.
- h) Just because a publisher has a final negative score does not necessarily imply that it is a predator. Both the score and the presence of very serious predatory factors (VSPFs) will make it predatory. VSPFs are indicated by red text in **Table 1**. For example, even if the PS is -25, but if it has no or limited VSPFs, then it could be considered to be a non-predator. Thus, even though the PS provides a quantitative system, the interpretation of the PS is subjective and subject to debate and multiple interpretations. Since many of the PFs are related to quality parameters of the publisher, and how quality is ensured, and demonstrated, it is almost impossible to have a perfect system, at least for now. The PS will be in a constant state of evolution.
- i) It is important to take into account as many factors as possible before a publisher is labeled as a predator, to provide a rounded assessment as distant as possible from bias. In general responsibility, technology, quality and ability are (and should) all be considered.
- j) When using the PS, the reader is always reminded that classification is an artificial system imposed by humans, itself on another artificially created system, the publishing process, and does not take place within a vacuum of information. Almost every aspect is linked and all proponents of the publishing process are also intricately linked. Inside this network of interactions, each proponent has its share of responsibilities (see Teixeira da Silva 2013). In addition to these proponents and their responsibilities, there are also wider-reaching factors that have an influence on the level of predation and on the publishing dynamic. However, these are beyond the scope of this paper.
- k) In **Table 1**, every PF has a positive or a negative score, ranging between 1 and 10. A score must be assigned to every single PF, except if that PF does not apply. In many cases, having a particular PF will gain, for example a positive score, but the absence of another PF within that PF set will also give a negative score. PF set = the set of PFs within one class of variables within **Table 1**, e.g., Medium and format or Peer review. Thus

the absolute nature of a publisher is not observed, rather its relative nature to other PFs. For example, **Example 1** of PF set 2, one would automatically assume that the first few aspects (PFs) are all positive, but the fact that non-specialists and generalists are used drags down the  $PS_J$  value for that PF set.

- l) Occasionally, there is a multiplicative factor (MF), which must be added after the sum of all the other scores has been calculated. The MF emphasizes how chronically acute the predatory nature of this aspect is. In select cases, which are clearly blatant predatory practices, highlighted by **white text in a red box**, i.e., the **VSPFs**, an automatic MF of  $\times 10$  is assigned to fortify how serious this PF is. **Table 1** currently lists 21 VSPFs which could be used by the community to consider a publisher predatory, although the score (i.e., PS) should also be observed. For example, although extremely rare, a highly experienced academic journal might not have a web-site. According to **Table 1**, this would be considered to be a VSPF, although that publisher might have a high positive PS. Thus VSPFs and the total PS must also be observed in consonance. The number of VSPFs might change in the future as the publishing landscape evolves.
- m) Wherever a publisher has multiple journals, a separate PS must be calculated for **each** journal. Then, the publisher's PS will be the sum of the PSs of all its journals. The logic behind calculating a separate PS for each journal is that each journal would have or would target a different pool of authors or group of scientists, e.g., an engineering journal would target a totally different pool of authors to an oncology or horticulture journal and different editorial boards who are also responsible for the quality of the journal and its publication. The PS can thus be used to quantify the predatory nature of a single journal or of a publisher, depending on the needs of the person using the PS to classify a publisher. Sometimes not all journals published by a publisher are predatory, but since the publisher is responsible for all journals under its publishing umbrella, the predatory nature of any one journal might automatically make the publisher predatory.
- n) The verification factor (VER), and on the verifiable and unverifiable nature of a journal. If a fact, or information, can be easily, clearly and openly accessed, without cost, on a publically available space, usually the web-site, then it is considered to be publically verifiable. If such information or facts are not visible on a web-site, but, upon request to the publisher for that information, it is provided, as requested, then it is also independently verifiable. In contrast, when information (or facts) is not visible on the web-site and is not provided by the editor or publisher upon request, or is provided in an incomplete manner, then that PF is considered to be unverifiable. Verifiable PFs receive a positive score of +1 while unverifiable facts must receive a score of -1. Unlike the PFs, which can range between 1 and 10, verification is only assigned a value of 1, and is either positive, or negative. Every PF must also receive a verifiable/unverifiable score, except where the PF does not apply. The example given in **Table 1** is an unverified case, so the PS is a raw PS value without verification, or  $PS_{RAW}$ . Only after critical questions have been posed to a publisher related to 100% of the aspects in **Table 1**, and after the publisher has been given ample time to respond, can a VER factor be assigned. In that case the  $PS_{RAW}$  will become the  $PS_{VER}$  (i.e., verified PS). The  $PS_{VER}$  is theoretically more accurate than  $PS_{RAW}$  but in cases where the publisher has no interest in being transparent or collaborating with the scientific community, it is conceivable that only the  $PS_{RAW}$  value will be available.
- o) The PS can be calculated by two equations, one for  $PS_{RAW}$  and the other for  $PS_{VER}$ . To be precise, the  $PS_{RAW}$  value is first calculated as  $RW \times MF$  where PS

is the Predatory Score, RW is the relative weighting (scale of 1 to 10) and MF is the multiplicative factor. Then, with this  $PS_{RAW}$  value, which is assessed independently by any member of the public or the scientific community, the publisher is approached about one or more of its journals. Once the publisher has responded about its own interpretation of the facts in **Table 1**, then a VER factor can be added and  $PS_{VER}$  can be calculated using the equation:  $PS_{VER} = (RW + VER) \times MF$ , where VER is the verification score (+1 or -1). The two VER values mean +1 = can be verified or -1 = cannot be verified (i.e., the publisher failed to or refused to verify the information). A publisher that does not respond to a question accurately and does not provide the exact requested information for any PF in **Table 1** will get a VER score of -1 for that PF.

- p) The PS is calculated for *one* journal, and the  $PS_P$  (PS of a publisher) is the sum of the PS of all its journals, i.e.,  $PS_{J1} + PS_{J2} + \dots + PS_{Jn}$  (where  $PS_J$  is the PS of a journal, J).

Case studies that calculate  $PS_{RAW}$  and  $PS_{VER}$  for different publishers and/or journals will be dealt with separately in other ensuing papers.

## HOW TO APPLY THE PREDATORY SCORE?

Based on these assumptions and on the calculations of **Table 1**, let us assume that the 16 examples (**Example 1** through **Example 16**) listed in the table footer represent a real case publisher. Note however, that the VER score (i.e., a verification that should be made independently of the publisher) is NOT included in these 16 examples, but must always be considered. Thus, **Table 1** represents a  $PS_{RAW}$  score. Moreover, these 16 examples represent ONE journal of a single publisher. Thus, to gather the true PS of a publisher (i.e.,  $PS_P$ ), the PS of all journals must be added (i.e.,  $PS_{J1} + PS_{J2} + \dots + PS_{Jn}$ ), while also taking into consideration, in a subsequent step, the VER values as  $PS_{VER}$ . Therefore, the PS presented next from the 16 examples is somewhat incomplete because it lacks publisher verification but still gives a good idea about the predatory nature of a publisher and/or journal based on the user's analysis and perception. Scores are (by accumulating the 16 PF sets):

**Example 1** : +4  
**Example 2** : +1  
**Example 3** : +1  
**Example 4** : -1  
**Example 5** : +2  
**Example 6** : -4  
**Example 7** : +2  
**Example 8** : -10  
**Example 9** : -2  
**Example 10** : +6  
**Example 11** : +6  
**Example 12** : -14  
**Example 13** : -14  
**Example 14** : +4  
**Example 15** : +23  
**Example 16** : -9

TOTAL SCORE = -5 =  $PS_{RAW}$ .

## HOW TO INTERPRET AND USE THE PREDATORY SCORE?

Using the 16 examples (**Example 1** through **Example 16**) listed above, it is easy to see that some PF sets (i.e., sets of factors related to publishing) have both positive and negative scores. In the case of this publisher, the overall score was slightly negative (-5). However, there were three cases of VSPFs which would make this a predator. The  $PS \times VSPF$  interaction would indicate whether a journal and/or publisher is predatory, or not. Since the score would be based on quantifiable factors and since it relies on many or

**Table 1** How to calculate the Predatory Score, or PS (PS<sub>RAW</sub> or PS<sub>VER</sub>).

Predatory factor (PF)#	Relative weighting (RW) <sup>1</sup>		Verification (VER): + verifiable (V) (+1) or unverifiable (U) (-1) for calculating PS <sub>VER</sub>	Multiplicative factor (MF)
	Yes (add + 1)	No (subtract -1)		
<b>Medium and format<sup>1</sup></b>				
<b>Select all three</b>	Print	+1	-1	× number of journals
	Online	+1	-1	× number of journals
	Print and online	+2	-1	× number of journals
Open access	+5	-1		
<b>No web-site</b>			-1	× 10
<b>Peer review<sup>2</sup></b>				
<b>No or false peer review</b>				× 10
<b>Select only one</b>	Double blind	+3		
	Blind	+2		
	Open	+1		
Reviewer ID public after acceptance?	+1	-1		
1 <sup>st</sup> review < 2 months?	+1	-1		
2 <sup>nd</sup> review < 4 months?	+1	-1		
Decision < 6 months?	+1	-1		
Decision < 1 month?			-3	
Non-specialist peer reviewer			-3	
Generalist peer reviewer			-1	
Specialist peer reviewer	+3	-1		
<b>Manuscript handling and management<sup>3</sup></b>				
Manuscript number assigned?	+1	-1		
Online submission and tracking system?	+2	-1		
Publication online < 8 months (total) after submission	+1	-1		
Publication online < 2 months after acceptance	+1	-1		
Publication print < 1 year after acceptance	+1	-1		
<b>Public communication channels<sup>4</sup></b>				
Commercial server-linked e-mail?	+2	-1		
Free-mail address (G-mail, Yahoo mail, Hotmail, Lycos, AOL, etc.?)			-1	
<b>No or false contact details</b>				× 10
Contact name available?	+1	-1		
Contact postal address available?	+1	-1		
Contact e-mail available?	+1	-1		
Contact telephone/fax/Skype available?	+1	-1		
On-demand real-time customer service?	+1	-1		
<b>Editor board<sup>5</sup></b>				
<b>No editor board</b>				× 10
Serious editorial problems*			-3	× each problem in list
International board (> 75% from different countries)?	+2	-2		
Qualified EiC (academic standing)?	+1	-1		
Qualified Editorial Manager (business standing)?	+1	-1		
Is EiC and CEO different?	+1	-1		
Technical editor	+1	-1		
Language editor	+1	-1		
Text editing?	+1	-1		
Statistician?	+1	-1		
Topical editors?	+1	-1		
EiC replaced every 3 years?	+1	-1		
Editor board details checked each year?	+1	-1		
Editor board members refreshed every 5 years?	+1	-1		
Full publications CV of all editors not visible or linked	+3	-3		
<b>Publisher and editor communication ability<sup>6</sup></b>				
Use of false names or aliases			-3	
Generic introduction			-2	
Generic conclusion			-2	
Open and transparent communication	+1	-2		
Grammar and spelling correct	+1	-1		
Polite communication	+1	-3		
Timely communication	+1	-1		
Responds to queries related to any aspect of publisher or publishing process	+1	-2		

Table 1 (Cont.)

Predatory factor (PF)#	Relative weighting (RW) <sup>1</sup>		Verification (VER): + verifiable (V) (+1) or unverifiable (U) (-1) for calculating PS <sub>VER</sub>	Multiplicative factor (MF)
	Yes (add + 1)	No (subtract -1)		
<b>Journal scope, title and content<sup>7</sup></b>				
Author guidelines copied or original?	+1	-1		
Author guidelines clear or unclear?	+1	-1		
Non-sensical title		-1		× number of journal titles
No error in title?	+1	-1		
No change in title?	+1	-1		
Is the title unique?	+1	-1		
Does the title match the scope/mission?	+1	-1		
Are papers that fall within the scope rejected without peer review?	+1	-1		
Multiple formats (print + online)?	+2			
Only one format (print or online)?		-1		
For OA papers, no license information on papers		-2		
<b>Official registration<sup>8</sup></b>				
Have no official number?		-1		× 10
Have ISSN number?	+1	-1		
Have DOI for each paper?	+1	-1		
Have other official number?	+1	-1		
<b>Ethics and quality control<sup>9</sup></b>				
No ethical guidelines		-1		× 10
Has ethical guidelines	+2			
Organism testing guidelines for bio-medical journals	+1	-3		
Conflict of interest statement required in each paper	+1	-1		
Official member of “ethical” board, group or body?	+1	-1		
Retraction policy or retraction with/without a formal reason	+1	-1		
No plagiarism check		-1		× 10
Plagiarism check (free software)	+1	-1		
Plagiarism check (commercial software)	+1	-1		
No erratum policy	+1	-1		
CrossRef <sup>®</sup>	+1	-1		
ISO number	+1	-1		
False claim to have an Impact Factor		-3		
Use of <i>neo</i> -factors to feign quality		-1		
<b>Server and web-site visibility/clarity<sup>10</sup></b>				
Security encoded or encrypted?	+1	-1		
No or rare connection (server) problems (< 5 times year)	+2	-1		
Some connection (server) problems (average of once a month)	+1	-1		
Multiple connection (server) problems (daily or weekly)		-2		
Top page hit of Google?	+2	-1		
Top page hit of Yahoo?	+1	-1		
<b>Web-site functionality, visuals and information<sup>11</sup></b>				
All links functional	+3	-3		
False links		-1		
All pages with appropriate content	+3	-3		
Excessive advertising		-3		
Unauthorized use of copyrighted material		-3		
Formally authorized use of relevant conference or association links or logos	+1			
Unauthorized use of conference or association links or logos		-3		
Excessive or prominent spelling mistakes or grammatical errors		-1		
Misleading language or information		-1		
Privacy policy and/or terms of use	+1	-1		

Table 1 (Cont.)

Predatory factor (PF)#	Relative weighting (RW) <sup>1</sup>		Verification (VER): + verifiable (V) (+1) or unverifiable (U) (-1) for calculating PS <sub>VER</sub>	Multiplicative factor (MF)
	Yes (add + 1)	No (subtract -1)		
<b>Recruitment and invitation of authors<sup>12</sup></b>				
Public recruitment boards or forums	+2	-1		
Direct post mail (personal)	+1	-1		
Direct e-mail (personal)	+2	-1		
Direct e-mail (robo-mails)	+1	-1		
Direct e-mail (spam)		-1		× 10
Identity of e-mail recipients revealed		-1		× 10
Content not linked to recipient		-1		× 10
Unfounded promise of rapid publication or quick review		-1		
No error with name and/or title?	+1			
<b>Recruitment and invitation of editors<sup>13</sup></b>				
Public recruitment boards or forums	+2	-1		
Direct post mail (personal)	+1	-1		
Direct e-mail (personal)	+2	-1		
Direct e-mail (robo-mails)	+1	-1		
Direct e-mail (spam)		-1		× 10
Identity of e-mail recipients revealed		-1		× 10
Content not linked to recipient		-1		× 10
No error with name?	+1			
<b>Publishing charge<sup>14</sup></b>				
No fee	+5	-1		
Hidden or disguised fees		-3		
Free PDF or hard-copy reprints	+5	-1		
Royalties paid	+5	-1		
< 100 US\$*		-1		
101 – 499 US\$*		-2		
500-999 US\$*		-3		
> 1000 US\$*		-1		× 10
Separate submission and publishing charge		-2		
Retraction charge (author error)		-1		
Retraction charge (publisher error)		-1		× 10
<b>Abstracting and indexing (A&amp;I)<sup>15</sup></b>				
False listing of A&I(s)		-1		× 10
Abstract deposit	+1	-1		× number of journals × number of A&I services × number of formats
Full text deposit	+2	-1		× number of journals × number of A&I services × number of formats
Policy related to digital preservation	+1	-1		
<b>Published papers<sup>16</sup></b>				
Few editorial errors (< 10 per paper)		-1		
Moderate editorial errors (11-50 per paper)		-2		
Serious editorial errors (> 50 per paper)		-3		
Absence/presence of few minor scientific errors (< 10)	+1	-1		× 2 for EACH original research paper or full research paper × 3 for EACH review or book chapter
Absence/presence of numerous minor scientific errors (≥ 11)		-2		× 2 for EACH original research paper or full research paper × 3 for EACH review or book chapter
Serious scientific error(s)		-1		× 10
Duplicate papers published in other journals		-1		× 10 × EACH duplicate paper
No plagiarism (<5% of text not truly plagiarized)	+1			
Soft plagiarism (5-10% of text truly plagiarized)		-1		
Serious plagiarism		-1		× 10 × EACH plagiarised paper
<b>Other actions, information or practices</b>				
Blatant theft or false use of copyright material, another publisher's name or material		-1		× 10 × EACH crime

**Table 1 (Cont.)****NOTES**

<sup>1</sup> The assumption here is not that any format is better than any other format, but rather than each format has a separate weighting because each format has a separate benefit. Only open access (OA) is given a positive score of +5 to indicate that it is a very positive component. **Example 1:** a publisher only has an online format that is OA will receive a +1 score for online and a +5 score for OA. But it will also receive a -1 score for no print and another -1 score for no print + online. Thus, the total score for this PF set (medium and format) for the publisher will be +4. Hypothetical case: If the publisher were to have no web-site, in print, it would receive a score of  $(-1 \times 10) + 1 = -9$  for this PF set (medium and format).

<sup>2</sup> The peer review process is most likely the most important quality control aspect of the publishing process, and thus how it is conducted will have a different weighting. Double blind is defined as the situation where the editor and the peer reviewer (PR) do not know the identity of the authors. Blind is whereby the identity of the authors is known by the editor, but not by the reviewer. Open is where the editor and peer reviewer know the identity of the author. Regarding a reviewer's ID after acceptance, it would be important to know the identity of the peer reviewer(s) in charge of quality control to ensure that no conflicts of interest (COI) exist. Regarding the speed of review, from experience, a well-conducted and thorough peer review process can be realistically completed within 2 months and each round of reviews will also take 2 months. Thus, considering a review process of two rounds of peer reviews and edits, 6 months would be considered to be reasonable. > 6 months is slow. < 1 month is excessively fast and might reveal either an excellent manuscript, or a fake peer review, or a rushed job. In all cases (1, 2, 6 months, this refers to the amount of time after submission). The category of PR into non-specialist, generalist (level 9) or specialist (levels 1-8) follows the scale in Fig. 1 of Teixeira da Silva 2013. **Example 2:** a publisher uses a double blind review so will receive +3. It also indicates clearly the name of the PRs online, thus +1. The 1<sup>st</sup> and 2<sup>nd</sup> reviews are all within 2 months each, so +1 for each PF. However, the decision takes 8-10 months, so it gets -1. The review involved the use of one non-specialist PR and one generalist PR, so the score is -4. Thus, the total score for this publisher for this PF set (peer review) will be +1.

<sup>3</sup> If a manuscript number is not assigned, it is not easy to track it, or its progress within the peer review process. In general, an online system also allows for tracking the progress of a manuscript's peer review, so it is considered to be a positive technology. Online publication is always faster than traditional print. **Example 3:** a publisher assigns a manuscript number after submission so will receive +1 but does not use an online submission system, so will receive -1. Total publication from submission to online posting is < 8 months but it takes 3 months after acceptance so the score is +1 and -1, respectively. The print version comes out within 1 year (submission to print), thus it receives +1. Thus, the total score for this publisher for this PF set (manuscript handling and management) will be +1.

<sup>4</sup> The use of e-mail addresses gives customer or user confidence. Commercial server-linked e-mail implies a formal e-mail address officially linked to the publisher e.g. journalname@publishername.com. The use of free e-mail accounts can be unreliable and in general be a poor image as being "cheap". Even though free e-mail addresses are useful, and often powerful, the generic nature and the lack of a link to a formal institute or company e-mail address reduces its "trustworthiness". Contact information and accessibility to assistance or information or advice is important. **Example 4:** a publisher uses two different free e-mail accounts and does not use a commercial server-linked e-mail, so it gets a double penalty, -1 for each category. Although it has a contact address, e-mail and fax number online, each gaining it +1 for each PF (so +3), there is no contact name nor is there real-time customer service so it will receive -1 for each of these misses. Thus, the total score for this publisher for this PF set (public communication channels) will be -1.

<sup>5</sup> The editor board represents the interface between publisher and the public and academic/scientific community. Thus, how it is constituted and managed are key factors with several important aspects that need to be considered. \* Serious editorial problems include, partially based on list indicated by Beall (2012a, 2012b): a) Enlist members of editorial boards that are not experts in the field; b) have an insufficient number of board members; c) have made-up (concocted) editorial boards (made up names); d) include scholars on an editorial board without their knowledge or permission; e) have board members who are prominent researchers but exempt them from any contributions to the journal except the use of their names and photographs; f) provide insufficient contact/affiliation information about board members (e.g., M. Khan, Pakistan); g) do not hold a PhD as a minimum requirement. If the board is made up of mainly individuals from a single country, it will be perceived as being biased. Thus decisions will reflect a strong cultural influence. The EIC and editorial manager should ideally be separate entities since their functions are radically different. Similarly, an EIC who is also the CEO may be perceived as having a COI. The existence of different types of editors is a very positive aspect. The refreshing of editorial board members prevents stagnation and limits COI. Also regular verification of information related to editors is important since editors can change institutes, pass away, etc. **Example 5:** a publisher's journal has a very international editor board with only 15% of members from any one country, so it gets +2. The EIC and editorial manager are qualified, but the EIC is the CEO, so its score is +1 +1 -1. There is a technical and language editor (so +1 each) but there is no text editing or statistician, so -1 each. Most editor board members are different specialists (i.e., topical editors), so +1. The EIC has been there for 5 years, so -1, and even though new editor board members are refreshed every 5 years, editor board member details are not verified, so +1 and -1, respectively. Thus, the total score for this publisher for this PF set (editor board) will be +2.

<sup>6</sup> How the editor or publisher communicate with the scientific community is important. This is one core aspect of public relations. The use of false names, generic or elusive titles, or hidden identities are all perceived as "hiding" something, and thus are a negative aspect. The tone and politeness, timeliness and openness of communication are all vital to build customer or author satisfaction and confidence. Generic introduction is something like "Dear colleague" while generic conclusion is something like "Yours sincerely, the Managing Editor". **Example 6:** an editor communicates with authors and never signs the name, only always as "The Editor", and never treats the author by name or by title, always as "Dear colleague", thus gets a double negative score, -2 x 2. The e-mails are well written, grammatically sound and sensible with clear English, and overall polite, so three positive scores: +1, +1 and +1. However, the editor takes over 2 weeks to respond to a simple query and never provides the responses to all queries, so it gets a double negative score of -1 and -2. Thus, the total score for this publisher for this PF set (publisher and editor communication ability) will be -4.

<sup>7</sup> Are the author guidelines original or have they been clearly copied from another source or publisher? Are the guidelines clear or unclear (meaning too complex, difficult to understand and unspecific)? The journal title and scope are the gate-way into a journal. Often the title can be misleading or reflect something that the journal scope or content do not and these are predatory practices. The use of various formats such as PDF, HTML, etc. can increase visibility and readability by data-bases and web-bots and crawlers. **Example 7:** the author guidelines appear to be original and are clear. So a +2 score is obtained. The title has no error, the title has stayed consistent throughout the history of the journal, and even though the title matches the scope, there are public reports that papers that clearly fall within the scope of the journal are being rejected. Thus, the four scores are +1, +1, +1 and -1, respectively. Unfortunately, there is a journal with the same title registered in another country, thus it gets -1 for this aspect. Finally, it only publishes using PDF, so -1. Thus, the total score for this publisher for this PF set (journal scope, title and content) will be +2.

<sup>8</sup> Registering a journal with an official international body or by using international systems can give the journal some credibility. **Example 8:** the publisher has not assigned any official number thus is given a score of -10. In fact, this is a serious problem and is thus considered to be a VSPF. Thus, the total score for this publisher for this PF set (official registration) will be -10.

<sup>9</sup> Ethics is the core of publishing and not only must the publisher have a moral code, but so, too must the author. The PS is the first quantitative means to verify the moral code of the publisher, while some verifiable systems are not in place to verify the moral code of the author (e.g., plagiarism detection software, declarations of COI, authorship participation declarations, etc.) although serious gaps in industry standards (regarding verification) still exist. Examples of some "ethics" bodies include (but not exclusive to): Open Access Scholarly Publishers Association (OASPA), Council of Science Editors (CSE), Committee on Publication Ethics (COPE), International Association of Scientific, Technical & Medical Publishers (IASTM), etc. The author is of the opinion that the Impact factor (IF) is not necessarily a measure of quality. However, the false use of the IF or the impersonation of the IF using IF-like factors such as quality factor or hit factor, etc. is perceived as being a way to create a false impression of quality, and thus both facets receive negative scores. **Example 9:** the publisher has ethical guidelines but is not an official member of any "ethical board", so it gets a +2 and a -1 score for these. It checks for plagiarism using free software, so +1. However, it neither has a retraction policy nor an erratum policy, thus gets -1 for each. It does not use CrossRef<sup>®</sup> nor does it have an ISO number, so -1 each. Thus, the total score for this publisher for this PF set (ethics and quality control) will be -2.

<sup>10</sup> The web-site is the face and image of a publisher in this day and age. Thus, issues related to web-site visibility and accessibility are important. If an author attempts to access a site, but the server is down, then basically information cannot be accessed, decreasing the confidence in a site. Also, if a search for a journal or publisher on the two main English web search Engines, Google and Yahoo, does not lead to a "hit" on the top page, then the web design is weak. **Example 10:** the publisher uses SSL encryption for important documents and has very rare server connection problems, so +1 and +2, respectively. A search for the journal and/or publisher yields a first page "hit" on both Yahoo and Google, so +2 and +1, respectively. Thus, the total score for this publisher for this PF set (server and web-site visibility/clarity) will be +6.

**Table 1 (Cont.)****NOTES**

<sup>11</sup> The image created by a web-site can strongly influence the perception of a potential author who is weighing the options of whether to publish in a journal or not. Thus, even superficial features such as drop-down menus, Flash functions or snazzy demos and video streams can all influence the perception of a publisher. This aspect is actually an interesting aspect of predatory publishing because even though the web-site may give the false perception of quality, e.g., through a high score, other PFs must be considered, as the PS takes into consideration. Issues related to web-site visibility and accessibility are important. Dead links, i.e. clicking a button expecting to find page content but finding the message “No link”, or “No content”, or “Under construction” all give a poor impression. Advertising is not necessarily a negative thing since it can help the publisher defray costs and act as an alternative revenue stream. However, excessive advertising that interferes with the visual or functionality of the site, with site navigation or with access to content is a negative and undesired aspect because it is a non-academic factor that may bring revenue but does not necessarily reflect scholarly or academic value. Excessive or prominent spelling mistakes or grammatical errors also give a negative impression. Untrue or misleading language or information on the web-site creates a false-positive impression, e.g., the claim to be a “leading publisher” when the publisher is only 1 or 2 years old. **Example 11:** the publisher does not use advertising, but no advertising is a neutral aspect, so no score. The links all work well and the page content matches with the buttons pressed, so +3 score for each aspect. Thus, the total score for this publisher for this PF set (web-site functionality, visuals and information) will be +6.

<sup>12</sup> Authors are one of the cornerstones of a publisher’s livelihood and journal survival. Yet, how authors have been, are and continue to be recruited is important. If the methods used are legal and valid, then competition and rivalry is fair. If not, then the methods are underhanded and unfair, and thus predatory, or suspect. Spam is defined as (Wikipedia) “the use of electronic messaging systems to send unsolicited bulk messages, especially advertising, indiscriminately”. **Example 12:** the publisher does not use public notice boards or direct post mail or even direct e-mail (personal or robo), thus it gets a score of -1 × 4. In fact, it tends to spam dozens of scientists at a time, although it does not reveal their identity as it uses the BCC. Thus, it has a VSPF and thus a score of -10. Thus, the total score for this publisher for this PF set (recruitment and invitation of authors) will be -14.

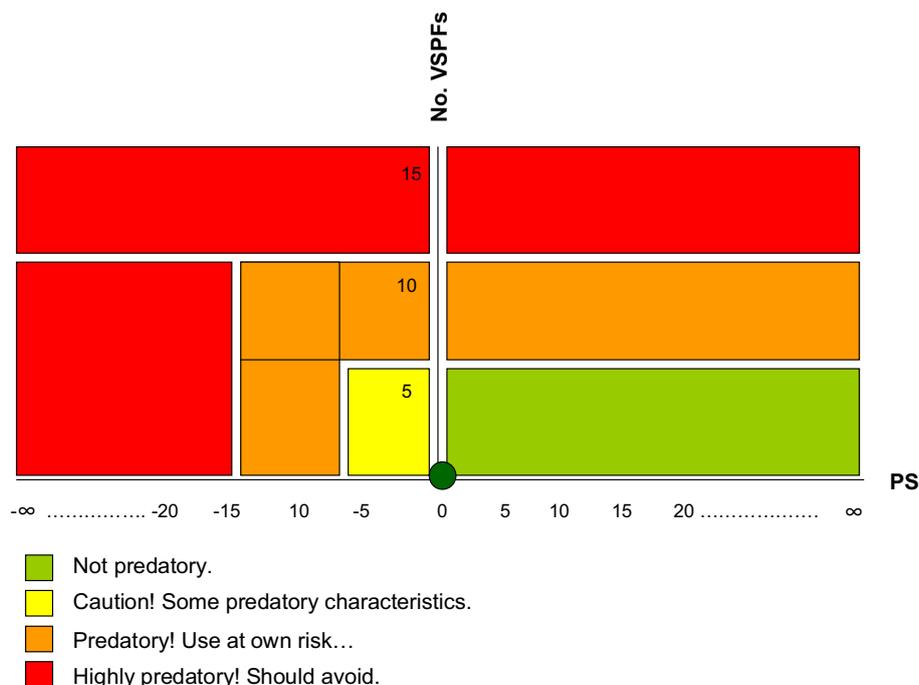
<sup>13</sup> Editors are another of the cornerstones of a publisher’s livelihood and journal survival and thus, as for authors, how they have been, are and continue to be recruited is important. If the methods used are legal and valid, then competition and rivalry is fair. If not, then the methods are underhanded and unfair, and thus predatory, or suspect. **Example 13:** the publisher uses the same methods as it uses for recruiting authors in Example 12, i.e., spamming, a VSPF, thus will receive an identical total score for this PF set (recruitment and invitation of editors) will be -14.

<sup>14</sup> Most publishers need an income stream to survive. This income can come from many sources. Non-commercial, academic societies tend to charge the authors for publishing while commercial publishers, even those that represent societal journals, might not charge authors, depending on the business model. OA journals may range from no charge (platinum model) to double-dipping (charging for publishing and charging for OA) \* indicates print or OA charge (the assumption is that money is money). **Example 14:** the publisher does not charge to publish so gains +5. However, if the author requests a retraction when the author has made an error (e.g., an ethical violation), then a charge is levied, so a -1 score is applied. Thus, the total score for this publisher for this PF set (publishing charge) will be +4.

<sup>15</sup> Thinking about posterity is important. The official registration of abstracts or full texts in A&I services ensures the long-term survival of a journal and a publisher. Multiple formats, i.e., diversification, and the use of different A&I services in different countries or public/private locations will all fortify the exposure and consequent viewership/readership while also attracting new authors. A&I services build publisher trust and confidence. **Example 15:** the publisher has one journal that it deposits in 3 abstracting services in online format and in 5 full-text indexing services in both print and online format. It will thus gain scores of +3 (i.e., +1 × 3) and +20 (i.e., +2 × +5 × +2). Thus, the total score for this publisher for this PF set (abstracting and indexing (A&I)) will be +23.

<sup>16</sup> One of the publisher’s primary responsibilities is to ensure that as many scientific and writing errors are eliminated before publishing the final paper. The underlying rationale is that perfection is most likely never possible, but errors, large and small, can be gradually eliminated with increasing levels of quality control, peer review, language editing, text editing, etc. Minor editorial errors include spaces, irregular styles in referencing, spelling mistakes, all related to editing oversight. This category also includes minor scientific errors that were neither apparently considered by the authors, nor captured by the publisher’s editor board or peer reviewers, such as incorrect sample sizes, mismatching data in tables vs text, incorrect reference information, referencing to incorrect tables or figures. Moderate and serious errors are of the same level of errors, but the volume of errors is higher. This value is calculated per published manuscript but should represent the average of one journal issue, and ideally the average of several journal issues to reduce the coefficient of variation. Regarding scientific errors, although this is a highly subjective opinion, it is an important one, nonetheless. Thus, a plant scientist calculating a PS for a plant science journal would most likely be able to assess the scientific quality of a paper and thus assign a positive or a negative value. If the methodology is sound, the results and correctly interpreted and the conclusions drawn there from are sound, then a positive score will be received, if not, then a negative score will be received, both proportional to the type of manuscript: +1 or -1 for opinion pieces, research notes or short communications), +2 or -2 for original research papers, full research papers, +3 or -3 for reviews or book chapters. Where a scientist is able to identify profound scientific flaws, a VSPF must be assigned. A profound scientific flaw can include flawed experimental design such as pseudo-replication, false or incorrect statistical analyses, absolutely no relation to the literature, i.e., factors that should have been captured by peer reviewers as being flawed but were allowed to pass through to the publication stage due to lack of scientific oversight (or other reasons). As for the editorial errors, this value is calculated per published manuscript but should represent the average of one journal issue, and ideally the average of several journal issues to reduce the coefficient of variation. For both editorial and scientific errors, the number of manuscripts and journal issues examined should be reported, always, so that repeatable comparisons can be made. Duplicate publications are considered to be a serious offense and responsibility by the publisher for a) not detecting the duplication and for b) not removing it. Thus EACH duplicate paper found should suffer a heavy penalty. In addition, the order of duplication is irrelevant, i.e., even if the duplicate appeared first or second, it is still a duplicate publication, independent of the reasons or excuses provided by the authors or other publisher where the cloned paper exists. Regarding plagiarism (used synonymously with self-plagiarism), I believe that this should be observed with some common sense. Except for truly fraudulent authors, the assumption is that a small amount of plagiarism (i.e., copied text or unquoted text or unduly referenced text) is not good, but is acceptable. However, as for scientific data analysis, the validity should be set at a 95% confidence limit, i.e., imagine that 423 words have been shown to be plagiarized from a total word count of 6127 words. This amounts to 6.9%, or low plagiarism, but plagiarism nonetheless, so a small negative score of -1 will be levied per paper. If >10% of text (i.e. > 613 words per total of 6127 words) is found, this could and should be considered to be serious plagiarism. If, for example, 216 words from a total of 6127 words is detected, i.e., 3.53%, then, statistically, there is no plagiarism. However, two aspects should be kept in mind here: 1) 216 words are still copied or plagiarized, so perhaps, if an important reference has been omitted, or if a word-for-word text has not been inserted in inverted commas to indicate a direct quote, then an erratum can easily be added online, even long after publication, to notify the public. Seriously plagiarized papers, which should never have been processed and published in the first place, should be retracted. A final note regarding commercial software: most software available on the market, although serving as powerful tools for detecting identical text, often identifies identical text that is absolutely unrelated. Thus, percentage of plagiarism, as calculated by commercial software (e.g., iThenticate®) should be used extremely cautiously when calculating the PF score here. These risks and topics will be discussed in detail elsewhere. **Example 16:** the publisher has made approximately 12 editing errors per page (n = sample number = 20 papers evaluated over 3 journal issues). Thus a score of -2 will result. When assessed by a scientist, 3 of the same 20 papers had a few minor scientific errors, and they were all original research papers. The score for scientific errors is thus: -1 × 3 × 2 = -6. Soft plagiarism was found in one of these papers, so a -1 score is assigned. Thus, the total score for this publisher for this PF set (published papers) will be -9.

**Abbreviations:** COI, conflict(s) of interest; DOI, digital object identifier; EiC, editor-in-chief; ISSN, International Standard Serials Number; OA, open access; PF, predatory factor; PR, peer reviewer; PS, predatory score; RW, relative weighting; VSPF, very serious predatory factor



**Fig. 1 The Predatory Score (PS) × very serious predatory factor (VSPF) interaction showing how a publisher could be classified as predatory based on quantitative parameters.** The PS and the “predatory” characterization should be used by publishers in self-assessment, i.e., to avoid being termed predatory, they would aim to achieve the positive aspects indicated in **Table 1**, so as to reduce their PS score and to gain a “green” label in this flow chart.

multiple factors, the PS score together with the interactive figure (**Fig. 1**) would give a good indication of the predatory nature of a journal or publisher, OA or print. This figure as well as the actual PS ( $PS_{RAW}$  or  $PS_{VER}$ ) could also be used by authors, the scientific community and the public in general to monitor publishers, either collectively, or individual journals. For example, using the X- and Y-axes of **Fig. 1** and the  $PS_{RAW}$  value calculated from **Table 1**, the publisher categorized by **Examples 1 to 16** is slightly predatory (or has some predatory characteristics) because the PS × VSPF interaction lies in the yellow zone. Thus, authors submitting to this journal should examine the PS report carefully to see what practices were predatory and how this could have a negative impact on them or their careers, CV or research institutes. Where publishers are demonstrating predatory behaviour, a concrete score can be used to then offer a form of criticism to the publisher’s management or editor board, requesting change. This can also allow the publisher or editor board of a journal to reflect on itself and, if necessary, based on the PS scores ( $PS_{RAW}$  or  $PS_{VER}$ ), the number of VSPFs or the PS × VSPF interaction, to make changes to reduce the PS values or to eliminate VSPFs. Each and every publisher should have two PS values ( $PS_{RAW}$  or  $PS_{VER}$ ), as should each of their journals.  $PS_{RAW}$  is determined exclusively by the public or scientific community while  $PS_{VER}$  is determined in consonance with the responses provided by a publisher regarding its own practices. In this way, an independent system becomes established, that is not controlled by the publishers, to monitor, and to a certain extent, enforce quality control, openness, fairness, and transparency.

### ASPECTS THAT ARE NOT NECESSARILY PREDATORY

There are several aspects which I do not consider to be predatory, even they are listed by Jeffrey Beall as predatory (in an OA context) (Beall 2012a, 2012b):

- 1) The author does not consider having a broad title to necessarily be a PF, for example, some of the world’s top science journals such as Science (American Association for the Advancement of Science) or Nature

(Nature Publishing Group) have extremely broad titles, yet those publishers may have (unsubstantiated claim) low PS values. However, the argument that broad titles is used by predatory publishers has some truth since broader titles tend to attract a wider authorship, and thus business. In this latter point, if a publisher has a strongly negative PS value and sits in the red zones in **Fig. 1**, and uses broad journal titles, e.g. Journal of Science (fictitious title), then the conclusion could be made that the journal title is predatory. Consequently, non-sensical titles that combine two or more areas of study or fields that are not normally associated, e.g., Journal of Plant Research, Law and Philosophy (fictitious title). See **Example 7** below.

- 2) “Require transfer of copyright and retain copyright on journal content. Require the copyright transfer upon submission of manuscript.” (Beall 2012a). I disagree with this assessment. Copyright is one way for a publisher to obtain a document that gives it legal rights to defend the use or to counter its abuse. Even if a publisher publishes papers or journals as OA, it can request a transfer of copyright without, in any way, affecting the OA nature of the paper. The OA nature of a paper does not depend on, nor is restricted by the use or presence of a Creative Commons (CC) license.
- 3) “Demonstrate a lack of transparency in its operations.” (Beall 2012a, 2012b). I disagree with this assessment. In this broad phrasing, transparency cannot be quantified. Moreover, transparency, like all aspects in life and science, has differing degrees. Consequently, the VER parameter has been introduced to upgrade  $PS_{RAW}$  to  $PS_{VER}$  because, only through direct verification from publishers (by scientists or the public), can then transparency be quantified.
- 4) “Have no membership in industry associations and does not follow industry standards.” (Beall 2012a). I disagree with this assessment for two reasons. Firstly, what are these “industry standards” and where can they be found? Are the same in the USA as they are for Pakistan? This term is misleading and clearly not applicable to a global scenario. Secondly, being a member does not necessarily imply that any publishing codes of

- conduct are being followed. Conversely, to claim that just because a publisher is not part of such an association is clearly erroneous. Many publishers publish well, with good standards and ethically without being part of an association.
- 5) "Set up shop in a first-world country chiefly for the purpose of functioning as a vanity press for scholars in a developing country." (Beall 2012a) and "Operate in a Western country chiefly for the purpose of functioning as a vanity press for scholars in a developing country." (Beall 2012b). I disagree with this assessment. Not only is this a borderline racist claim, it undermines the valid efforts of foreign nationals (from developing nations) who do conduct valid and fair practices in developed countries. The premise of the Beall claim is two-fold incorrect because not all individuals from developing countries are frauds and because not all vanity publishers (i.e., for-profit OA publishers) conduct fraudulent activity.
  - 6) "Begin operations with a large fleet of journals, often using a template to quickly create each journal's home page." (Beall 2012a, 2012b). I disagree with this assessment. There is absolutely no reason to believe that a publisher cannot handle 10 or 500 new journals. Moreover, some template banks and OA template donors can be useful for start-up publishers, saving time, costs and reducing the amount of staff required for maintaining the publishing operation. However, after the journals have been officially launched, and after some time has been given, for example, one year, to assess their activity and performance, can the PS in **Table 1** then be applied to that publisher and its fleet of journals. Preemptive strikes based on numbers are dangerous because they are unfounded. The assignment of massive blocks of ISSN numbers is an issue that needs to be addressed and responded to by the ISSN and this topic has been addressed in a separate paper in this special issue.
  - 7) "The "contact" us page only lists a webform." (Beall 2012a) and "Have a "contact us" page that only includes a web form" (Beall 2012b). I disagree with this assessment. A webform is a practical and useful way of addressing the scientific community and public's concerns. This is not a problem provided that the incoming requests posted through that web-form are fully responded to, that the delivery of the online request is delivered and that the response is clear and timely (within a few working days).
  - 8) "Use strange names to attempt to draw attention to the publisher (e.g. Wudpecker Journals)." (Beall 2012a). I disagree with this assessment. Even though a name may appear rather silly, there is a large gap between silly and predatory. Silly is the scientist who submits a paper to a journal with a silly name soon after the publisher has been launched. Even some publishers with "silly" or strange names might have excellent publishing skills and practices. Thus, name could be a note of caution, but calculating the PS value from **Table 1** would truly indicate the predatory nature of the publisher. To counter the Beall claim (2012a), if a journal with a "silly" name had a PS score of let's say, +10, and almost no VSPFs or the PS  $\times$  VSPF interaction was in the green zone (**Fig. 1**), this would invalidate the association between "strange names" and predation.
  - 9) "Provide links to legitimate conferences and associations on the publisher's main website in order to steal some of the organizations' legitimacy and paint the publisher with it." (Beall 2012a). I disagree with this assessment but this may be because the way in which it was stated above was euphemistic. Firstly, the word theft is very strong and even libelous if theft cannot be proved. Academic conferences can have excellent academic value and an association between a conference and a web-site of a journal thematically related to that conference is an extremely positive point. If, after contacting a conference organizer or organization management about the posting of a conference logo or link to a journal or publisher's web-site without formal permission, then yes, it is predatory.
  - 10) "Have duplicate editorial boards (i.e. same editorial board for more than one journal)." (Beall 2012a) and "Two or more journals have duplicate editorial boards (i.e., same editorial board for more than one journal)." (Beall 2012b). I disagree with this assessment. Even though it is easy to see the logic of this assessment, it is not necessarily true, nor does it necessarily reflect any predatory characteristics. For example, a publisher publishing two journals, one about plant physiology and another about plant stress, could readily have the same or closely overlapping editor boards. Although it is advisable to try and keep editor boards different and separate, this might not always be practically possible, e.g. due to limited number of specialists for each theme. Certainly, it is not a predatory characteristic, especially if the editors have been fully informed of this decision by the publisher and have agreed to this condition (or have not explicitly disagreed with it).
  - 11) "For the name of the publisher, use names like "Network," "Center," "Association," "Institute," etc. when it is only a publisher and does not meet the definition of the term used." (Beall 2012a). I disagree with this assessment. Many such organizations can represent a valid way of organizing a publishing structure that would allow for efficient management of the entire publishing process. In fact, many academic journals are started precisely by Institutes. Thus, to simply label a publisher due to its use of one of these four words is preposterous. If, however, after assessing the PS and the PS  $\times$  VSPF interaction, and if then the publisher is found to be predatory, then this is not because it contains word X, Y or Z in its name but rather because several factors (PFs) have led it to be labeled as predatory.
  - 12) "Publish papers that are pseudo-science." (Beall 2012a) and "Publish papers that are not academic at all, e.g. essays by laypeople or obvious pseudo-science." (Beall 2012b). I disagree with this assessment. What is pseudo-science? In this world, nothing is obvious. Everything, including the laymanship of a layperson, must be proved.
  - 13) "Misrepresent the true country of publication in the publisher's name (e.g. Canadian Center of Science and Education)." (Beall 2012a) and "The name of a journal does not adequately reflect its origin (e.g., a journal with the word "Canadian" or "Swiss" in its name that has no meaningful relationship to Canada or Switzerland)." (Beall 2012b). I disagree with this assessment. If a publisher is established in Canada, then why should the publisher's name or its journals not contain the word "Canada"? There could be debate surrounding the use of a country's name in a publisher or journal title when operating from another country, to feign quality but this is also debatable and is not a clear-cut reason for listing the publisher as predatory. For example, why should a Bangladeshi publisher that calls its publisher, for example the Australian Science Center publishing a journal title, for example, The American Journal of Wheat Research, be invalid or predatory? The logic is similar to my discussion of "silly" above in 8) or the automatic false (and prejudicial) assumption or association made simply by inclusion of some key-words, as explained above in 11).
  - 14) "Have a contact address that turns out to be somebody's apartment." (Beall 2012a). I disagree with this assessment. Can a valid publishing operation not be launched from or operated from an apartment? Google started in a garage. It is a misnomer than good publishers can operate when out of a classy office block. In fact, many publishers that publish from classy office blocks have some VSPFs.

- 15) "Focus on authors (not readers) and on getting their fees at the expense of readers, and offers few or no value adds to readers such as RSS feeds, hotlinked references, etc." (Beall 2012a). I disagree with this assessment. Firstly, it is extremely difficult, if not impossible, to prove intent and focus. Also, RSS feeds can be useful if used effectively. Provided that such "extras" do not distract from the main function of a journal or publisher's web-site, i.e. to provide information to the academic community, I see no problems with these aspects and would thus not consider them to be predatory.
- 16) "When an author submits a paper, the publisher asks the corresponding author for suggested reviewers. Then the publisher uses the suggested reviewers without sufficiently checking their qualifications. This allows authors to create fake online identities and review their own papers." (Beall 2012a) and "The publisher asks the corresponding author for suggested reviewers and the publisher subsequently uses the suggested reviewers without sufficiently vetting their qualifications or authenticity. (This protocol also may allow authors to create faux online identities in order to review their own papers)." (Beall 2012b). Although I do agree that editor background and qualification should be verified, I disagree with the wording and associations of this assessment, particularly in the former statement. Indeed, any time that a journal or publisher asks the author to take care of a responsibility that is or should be exclusively that of the publisher, there will always be a risk of a conflict of interest (COI). To avoid COIs, publishers should always select peer reviewers. The creation of fake online identities and the self-reviewing of a paper does not seem to be the predatory characterization of a publisher, and appears rather to be related to the ethical nature of the author, i.e., it is misdirected parameter, incorrectly associated with publisher predation.
- 17) "The publisher is set up and run by a single man who is very entrepreneurial; the man may have business administration experience, and the site has business journals but it also has journals that are outside the experience of the entrepreneur or anyone on his staff." (Beall 2012a) and "The publisher's owner is identified as the editor of all the journals published by the organization." (Beall 2012b). I disagree with this assessment. The former also appears to be sexist, giving the impression that only men are predators or capable of being predators. Even though there may only be a single entrepreneurial person at the helm of a publisher, what's wrong with that? Provided that the publishing activities are being conducted effectively and professionally, and provided that the PS and the PS × VSPF interaction lead to a non-predatory result, is it not possible that one person could effectively do the work that 10 or more incompetent people can not?
- 18) "Depends on author fees as the sole and only means of operation with no alternative, long-term business plan for sustaining the journal through augmented income sources." (Beall 2012b). I disagree with this assessment. Sometimes this is the only business model available. The assumption, an incorrect one, that Mr. Beall is making, is that every publisher must be a successful business operation. Although financial stability is essential for survival and continuation, surely it is the academic-related issues that take first preference? Secondly, "Augmented income sources". In the current serious economic global financial crisis, such alternatives are few or far between, or beyond the reach of many start-up publishing houses. An unfair playing field or imbalanced opportunities should never be equated with predation.
- 19) "The publisher dedicates insufficient resources to preventing and eliminating author misconduct, to the extent that the journal or journals suffer from repeated

cases of plagiarism, self-plagiarism, image manipulation, and the like." (Beall 2012b). I disagree with this assessment's wording. Although I agree that greater effort must be made to reign in unethical author behaviour, the explicit request to invest in more resources to do so could be a very controversial issue. For example, I am of the opinion that the commercialization of ethics by companies and so-called "ethics" bodies is in itself unethical. Ethical regulations should be free for the entire community to use, including publishers in their pursuit of publications free of such unethical manipulations. The biggest issue is who should foot the bill to create a free software and plagiarism detector? I believe that Ministries of Education have this responsibility.

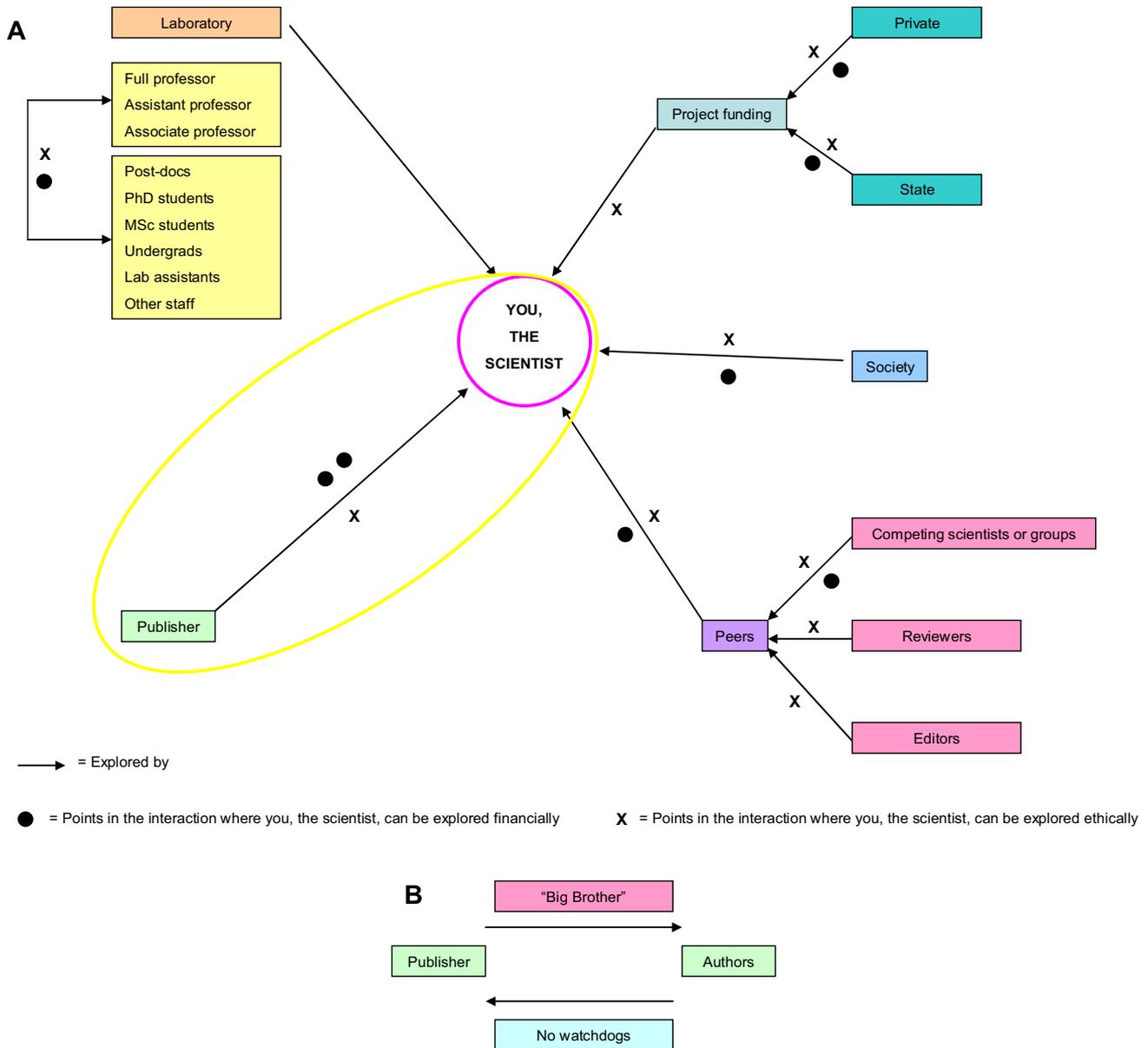
The *verbatim* list in **Appendix 1** from Beall (2012b) is clearly a more carefully reflected improvement of the Beall (2012a) paper, yet lacks the quantification provided in this paper by the PS, and is thus, consequently dangerously accusatory to any publisher that has been characterized using those criteria, even though Beall does reserve the use of the conditions to describe problems with quality *versus* problems with predation. Even so, Beall (2012a) contradicts Beall (2012b) in many fundamental aspects, reflecting, perhaps, a process of maturity and need to consider the opinions of others.

## CONCLUSIONS

Predatory publishing is a reality of science and of publishers. Not only do authors now have the responsibility of assessing the predatory score of a publisher, but so, too do publishers have the responsibility of assessing themselves to avoid being labeled as predatory. The scientist is preyed from various fronts (**Fig. 2**), often unsuspectingly, and often without knowledge, simply because, until now, there were insufficient academic channels warning of this risk. Indeed, there are one or two blogs, but blogs do remain blogs, i.e., a public arena for open and frank discussion, but the scientific community has to take the responsibility into its own hands to now quantify the predatory nature of journals in their fields of study and publishers, using a quantitative system, the Predatory Score, or PS. The objective is two-fold: a) to keep the playing field fair, i.e., as equally as scientists are under constant monitoring by the publishing community and must be held accountable for their actions, so too must publishers be carefully, methodologically and quantitatively scrutinized so that the publishing industry is balanced; b) to quantitatively implement transparency, since this facet is grossly lacking in the current publishing climate. One thing is to state an opinion, which is of course fair and valid, and all opinions on both sides of the discussion should be respected, but it is another thing to support those claims with a number or value that lends support to our theory. The PS is meant not to be persecutory as it is meant to be a means to correct visible ills in the publishing industry.

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**Fig. 2** The potential sources of influence on a scientist and the ways by which a scientist can be predated upon, either financially, or ethically. (A) Once one can appreciate the complexity of this vulnerability, whether it in fact happens or not, then the existence of predatory publishing becomes much easier to understand. The yellow oval indicates the focus of this study, i.e., the predatory nature of publishers, as a subset of the total predatory landscape underlying science. Two black dots are indicated that predation can occur not only in terms of the data set (or intellectual copyright), but also in terms of money, i.e., financial predation, or the “double whammy”. (B) Although there are many check-points and controls in place by the publishing industry to “control” and monitor the scientific community, the reverse is not true. Currently, there are no customer or consumer watchdogs that work across transnational lines.

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**Appendix 1 (verbatim listing of poor journal quality standards, according to Beall (2012b), with formal assistance by Bill Cohen and Michael W. Firmin. Bullets were substituted with numbers for easier organization.**

“The following practices are considered to be reflective of poor journal standards and, while they do not equal predatory criteria, potential authors should give due consideration to these items prior to manuscript submissions:

- 1) The publisher copies "authors guidelines" verbatim (or with minor editing) from other publishers.
- 2) The publisher lists insufficient contact information, including contact information that does not clearly state the headquarters location or misrepresents the headquarters location (e.g., through the use of addresses that are actually mail drops).
- 3) The publisher publishes journals that are excessively broad (e.g., *Journal of Education*) in order to attract more articles and gain more revenue from author fees.
- 4) The publisher publishes journals that combine two or more fields not normally treated together (e.g., *International Journal of Business, Humanities and Technology*).
- 5) The publisher requires transfer of copyright and retains copyright on journal content. Or the publisher requires the copyright transfer upon submission of manuscript.
- 6) The publisher has poorly maintained websites, including dead links, prominent misspellings and grammatical errors on the website.
- 7) The publisher makes unauthorized use of licensed images on their website, taken from the open web, without permission or licensing from the copyright owners.
- 8) The publisher engages in excessive use of spam email to solicit manuscripts or editorial board memberships.
- 9) The publishers' officers use email addresses that end in .gmail.com, yahoo.com some other free email supplier.
- 10) The publisher fails to state licensing policy information on articles or shows lack of understanding of well-known OA journal article licensing standards.
- 11) The publisher lacks a published article retraction policy or retracts articles without a formal statement; also the publisher does not publish corrections or clarifications and does not have a policy for these issues.
- 12) The publisher does not use ISSN numbers, DOI numbers or uses them improperly.
- 13) For the name of the publisher, the publisher uses names such as "Network," "Center," "Association," "Institute," and the like when it is only a publisher and does not meet the definition of the term used.
- 14) The publisher has excessive advertising on its site to the extent that it interferes with site navigation and content access.
- 15) The publisher has no membership in industry associations and/or intentionally fails to follow industry standards.
- 16) The publisher includes links to legitimate conferences and associations on its main website, as if to borrow from other organizations' legitimacy, and emblazon the new publisher with the others' legacy value.
- 17) The publisher displays prominent statements that promise rapid publication and/or unusually quick peer review.
- 18) The publisher focuses on authors (not readers) and on getting their fees at the expense of due quality, and offers few or no value adds to readers such as RSS feeds, hotlinked references, or the like.
- 19) The publisher creates a publishing operation that is set up and run by a single individual who engages in rapacious entrepreneurial behavior. The individual might have business administration experience, and the site may have business journals but it also has journals that are outside the experience of the entrepreneur or anyone on staff.
- 20) The publisher or its journals are not listed in standard periodical directories or are not widely cataloged in library databases.
- 21) The publisher copies or egregiously mimics journal titles from other publishers.
- 22) The publisher uses text on the publisher's main page that describes the open access movement and then foists the publisher as if the publisher is active in fulfilling the movement's values and goals.
- 23) None of the members of a particular journal's editorial board have ever published an article in the journal.”