**Stance in article highlights: The promotion**

**of Covid-19 research**

**Abstract**

Covid-19 is the greatest public health crisis for a century, accounting for millions of deaths and initiating an urgent surge of published biomedical research. In this climate of social anxiety, researchers scrambled to publicize their work and achieve a medical breakthrough. The use of journal highlights, a brief bullet pointed list summarising the novel results of a study, is an important tool in this promotional endeavour. In this study we focus on the stance taken by authors in this genre by examining 300 highlights dealing with the virus and compare them with 300 from articles in the same 16 journals on with other medical issues. Our results show significantly greater use of stance markers in the Covid highlights with hedges, boosters and self-mention particularly marked. Our study offers both a robust description of stance in highlights and an understanding of the potential impact of the intense, high-stakes competition generated by the Covid pandemic in biomedical publishing. We believe this offers a valuable contribution to the literature on stance, academic discourse and rhetorical persuasion.

**Keywords:** highlights, stance, Covid research, promotion, biomedical publishing

**1. Introduction**

While Covid-19 is now largely treated as a contextual given, part of the background of life, for nearly three years it had a catastrophic impact across the world. By the end of February 2023 there have been over 760 million confirmed cases and some 6.9 million reported deaths[[1]](#footnote-1), leading to a surge in bio-medical research to understand and contain the virus (e.g. Author 2 & Other, 2021). Non-covid clinical trials were suspended globally and Elsevier reported that COVID research comprised 20% of all biomedical investigations (Harper et al, 2020). The World Health Organization (WHO) estimated that over 50,000 studies of Covid-19 had been published by July 2020 (Allen-Mills & Gregory, 2020).

In this intense, competitive atmosphere, there was a dramatic escalation of scientific publishing with journals overwhelmed with Covid related manuscripts, often publishing papers in under two weeks after submission (Tingley, 2020). Simultaneously, thousands of papers were uploaded to open-access preprint servers, such as BioRxiv, for immediate dissemination without peer review and elite medical journals such as *The Lancet* and *The New England Journal of Medicine*, made coronavirus papers freely available online. The time available for peer review was unable to keep pace with this tsunami of publication, especially as results were rapidly picked up and often sensationalised by mainstream and social media outlets for an audience less familiar with medical research. Thus the fevered atmosphere of the scramble to get work noticed precipitated a growth of fraud with over 300 Covid papers retracted since the pandemic began[[2]](#footnote-2), some from the most prestigious medical journals, leading the New York Times to claim that peer review is broken[[3]](#footnote-3)

In this context, ensuring the visibility and value of Covid research has become an intense, high pressure activity. The use of journal highlights, a brief bullet pointed list summarising the novel results of a study, is an important strategic tool in this promotional endeavour. This is a part-genre bound to the journal article and often readers’ first encounter with its content; in the context of the explosion of Covid-related papers, it offers authors the chance to give prominence to their work and help hook potential readers. In this study we are interested in how writers make best use of this opportunity, investigating the stance they take in this compressed synopsis to provide an advertisement for their work. Using Author 2’s (2005) stance model, we compare key stance indicators in 300 Covid-19 highlights and 300 non-Covid-19 highlights to address these questions:

(1) How do academics manage their stance in Covid-19 journal article highlights?

(2) How does stance differ in Covid article highlights and non-Covid highlights?

(3) How can we account for these differences?

In answering these questions, we hope to clarify the expression of stance in a compressed space and how scientists take a position to frame Covid-19 issues. We hope to shed light on academic persuasion in a relatively new and under-explored genre. The results may be of interest to those concerned with features of academic writing, rhetorical persuasion and the presentation of scientific findings on public health issues.

**2. Journal article highlights**

Highlights are a group of three to five bullet points with a length of under 85 characters written to convey core research findings and offer readers a quick overview of a research article[[4]](#footnote-4). They were introduced in 2010 and are mandatory in all Elsevier’s journals as well as being taken up by some other publishers. They help increase the discoverability of an article via search engines which are designed to locate key terms or characters specified by the user. Elsevier claims that highlights widen the reach of research and ensure that a paper reaches the intended audience ‘both inside and outside your usual research community’. While telegraphic, they are often the readers’ first encounter with an article and seek to grab attention by not being merely relevant, but offering the reader fascinating, if not ground-breaking, research. This example gives some flavour of this:

1. Highlights

# CCL17, IFN- l 3, IL-6, IP-10, and CXCL9 were predictor for COVID-19 prognosis.

# CCL17 were showed strong association with the development of severe pneumonia.

# A flare-up of IFN- l 3, IL-6, IP-10, and CXCL9 were a trigger for severe symptom.

# The downregulation of CCL17 could be unique in COVID-19. (Gene, 2021)

As what Elsevier describes as the “elevator pitch” of an article, highlights assist writers to establish their voice, increase the visibility of their work and foreground the main and distinctive claims to attract a wide audience. These bullet points can therefore widen the possibility that potential readers, swamped by the torrent of published work, will see the article amidst the noise of the scramble to publish and have work cited. As Yang (2016) points out, well-constructed, closely-linked highlights can concisely tell a story about a paper and help readers to quickly gain a better sense of the entire work. By conveying the core findings and essence of the study, highlights thus act as a filter for potential readers, perhaps reassuring those without full access to the article that the paper will contain the required information. Yang (2016), additionally suggests that highlights also help editors form an initial impression of the article and decide whether it should be sent for review. Effective highlights, then, have advantages for editors, reviewers and readers and so crafting them effectively becomes a critical task for academic writers.

Overall, however, the article highlight can be seen as a promotional genre which is closely linked with the “marketization” (Shaw et al., 2014; Millar et al., 2019) of a particular work. It offers researchers an opportunity to emphasise the impact and importance of scientific research and promote the visibility of a study. This may be particularly relevant given the frenetic pace of Covid-19 research.

**3. Promotion, stance and COVID**

Promotional values are a dominant characteristic of professional and academic genres. Grant applications, confer­ence abstracts, acknowledgements and Randomised Control Trials, for example, all work, in one way or another, to sell an idea or the writer’s credibility to readers. Rhetorical devices are deployed to ‘market’ (Fairclough, 1995), ‘boost’ (Author 2, 1999) or ‘hype’ (Miller et al, 2019) the importance or viability of research, expand its visi­bility, and associate the writer with an intended audi­ence (Bhatia, 2005; Zulkipli & Ariffin, 2019). The promotion of research findings, moreover, seems to be growing with concern expressed by scientists and editors about the widespread use of ‘positive descriptors’ (Vinkers et al 2015) and ‘drama words’ Wheatley, 2014). This growth of promotional language (Author 2 & Other, 2019) is related to both the enormous increase of research and the fierce competition created by a growing assessment culture. With perhaps nine million scholars striving to publish in English-language journals each year (Schneegans et al, 2021) and 3 million peer reviewed papers published (Johnson et al., 2018), there is growing pressure on scholars. This pressure, moreover, has been ramped up by the urgent need to address the bio-medical challenges posed by the greatest public health crisis in a century.

Given the promotional character of a growing range of academic genres, it would be surprising if highlights were immune from this trend. Here is an opportunity for scholars to

‘marketize’ (Shaw et al., 2014) their research by promoting the accompanying article. Through this channel, academics are able to position themselves in relation to their arguments and audience, promote their research contribution and underline the value of the scientific study. This is, then, is a genre which involves writers taking a clear stance.

Stance refers to the ways that writers insert themselves into their texts to convey their integrity, credibility, involvement and a relationship to their topic and audiences (Author 2, 2005). It is an attitudinal element of interaction and concerns how writers rhetorically mark their personal authority and assessments. It is seen to have three parts: evidentiality, affect and relation. *Evidentiality* indicates the degree of confidence the writer/speaker has in what is said and refers to evaluations of truth of statements; *affect* relates to the writers/speaker’s personal and professional assessment of matters; and *relation* to how writers’ discursively construct a relationship with an audiences and the degree of intimacy or remoteness this involves (Biber, 2006; Author 2, 2005). Stance, then, is founded on a view of writing and speaking as social engagement. It therefore reflects membership of a community, or discipline, in expressing a writer’s socially defined persona, or what Campbell (1975, p. 394) refers to as the ‘created personality put forth in the act of communicating’

Studies have explored the use of stance in a variety of academic (Feng & Shi, 2004; Gross & Chesley, 2012) and professional (Author 2, 1998; Liu & Zhang, 2021) genres as well as spoken (Author 1 & Author 2, 2022b) and written (Author 2, 1999) modes. This work has shown that stance varies across different disciplines (Yang, 2016) and genres (Author 1 & Author 2, 2022b) and that stance features tend to cluster in places where writers seek to be most persuasive (Author 1 & Author 2, 2022a). However, highlights, perhaps because of their peripheral status, have largely escaped research attention. In one of the few studies, Yang (2016) found that disciplines differ slightly in their use of stance and engagement to highlight the sections of research articles. But little is known about how authors, writing in the same journals, employ this resource to meet the urgent challenges posed by getting research noticed and read during a pandemic. Author 2 & Other (2021) found significant ‘hyping’ of novel results and methods in research articles dealing with Covid issues, and it would be surprising if we did not find similar promotion of work in highlights. We now turn to this question.

**4. Methods and procedures**

**4.1 The corpora**

We compiled two corpora of article highlights from the same 16 high impact SCI-indexed journals in the field of medicine. All were published between 2020 and 2023 by *Elsevier* to ensure a standardised format of highlights (refer to Appendix). 300 highlights focusing explicitly on the virus were collected by a search for the Keywords “Covid-19, SARS-CoV-2, Coronavirus 2019, Corona Virus 2019, novel coronavirus or 2019-nCoV”, following Author 2 and Other (2021). In addition to containing these keywords, our criteria were that the highlights:

1) were written in English;

2) were written by different authors;

3) reported research on medical Covid-19 issues.

Stratified random sampling was then used to col­lect highlights from each journal. We also built a reference corpus of 300 highlights from articles in the same 16 journals dealing with other medical issues for purposes of comparison. Stratified random sampling was also adopted to select them. The highlight corpus comprised 600 texts of 31,867 words. Details are given in Table 1.

**Table 1.** Corpora sizes and composition

|  |  |  |
| --- | --- | --- |
|  | Number of highlights | Total words |
| Covid highlight corpus | 300 | 16,667 |
| Reference corpus  | 300 | 15,200 |
| **Total**  | 600 | **31,867** |

**4.2 Annotation and analysis**

We analysed the corpora using Author 2’s (2005) stance model as this has proved useful to researchers studying a range of genres as diverse as research articles (e.g., McGrath & Kuteeva, 2012) and online book reviews (Author 1 & Author 2, 2022a) to 3-minute theses (Author 2 & Author 2, 2022b) and TED talks (Scotto di Carlo, 2014). The model comprises four broad functional categories:

* **Hedges** withhold complete commitment to a proposition and open a space for others to dispute interpretations.
* **Boosters** help writers/speakers present their work with assurance and shut down alternative voices.
* **Attitude markers** indicate affective, rather than epistemic, attitudes, conveying surprise, agreement, frustration, etc.
* **Self-mention** is the writers/speaker’s intrusion in the text to emphasize their contribution through use of first-person.

The formal resources within these categories provide writers with what Author 2 (2005: 41) refers to as a writer’s “armoury of rhetorical appeals” - or strategies for arguing and persuading.

The COVID and non-COVID highlights corpora were searched for features identified by Author 2 (2005) using AntConc (Anthony, 2022). This inventory consisted of 350 high frequency stance features together with additional items added by the authors after studying the corpus. Next, all retrieved items were concordanced and manually checked to ensure that they performed the stance function we had assigned them using the list above. A 30% sample was then independently coded by each author, with an inter-rater agreement of 96%. Each author conducted an intra-reliability test by re-categorizing 25% of the cases two weeks after the initial coding with full agreement between the two categorizations. Finally, the frequencies of each feature were calculated after normalizing the results to 1000 words to allow for cross-corpora comparison. Statistical significance of the results was determined using the Student t-test in SPSS (version: IBM SPSS Statistics 24). The results are discussed in the following sections.

**5. Stance: results and discussion**

Overall, we found 701 stance devices in theCOVID highlight corpus and 446 in the reference corpus. This was 42.06 items per 1,000 words in the former compared with 29.34 in the latter. The details are presented in Table 2. These frequencies make it clear that academics are clearly aware of the persuasive function of highlights and the need to convey a stance towards their topic and audiences. This is especially the case when positioning themselves in relation to the COVID issues, with a significant difference in frequencies (log Likelihood =35.08, p <0.001).

**Table 2.** Stance features in the two highlight corpora (per 1000 words and %)

|  |  |  |
| --- | --- | --- |
|  | **Covid-19 highlights** | **Reference highlights** |
|  | per 1,000 words | % | per 1,000 words | % |
| Hedges  | 10.74 | 25.53 | 7.43 | 25.34 |
| Boosters | 11.70 | 27.82 | 7.57 | 25.78 |
| Attitude markers  | 13.44 | 31.96 | 12.24 | 41.70 |
| Self-mention | 6.18 | 14.69 | 2.10 | 7.18 |
| **Total**  | **42.06** | **100.00** | **29.34** | **100.00** |

These overall differences indicate that the construction of stance in highlights is highly influenced by the particular topic of the accompanying paper. The urgency of research and competitive pressures of publishing Covid studies provides a different context for the ways academics present their research and interact with the audience. Frequencies were higher in all four stance categories in the COVID highlights (log Likelihood =13.81, p <0.001 for hedges, log Likelihood =17.09, p <0.001 for boosters and log Likelihood =23.34, p <0.001 for self-mention). We interpret these findings as showing that, in the Covid-19 highlights, researchers were striving harder to gain the attention of specialists and others and encourage them to read their research. The additional investment in producing a more visible stance is an attempt to get their support through a stronger interpersonal relationship. Some stance features, especially boosters and affective markers, in fact, are particularly effective in creating a robust promotional context to ‘sell’ the study. In the following sections, we present our results by stance category.

**5.1 Hedges**

Hedges downplay a writer’s commitment to a proposition, modifying its scope, relevance or certainty. They allow writers to convey academic arguments with greater precision by downplaying their commitment to a proposition, modifying its scope, relevance or certainty (Author 2, 1996; 2005). For Author 2, the decision to hedge a claim therefore signals the writer’s decision to step explicitly into a text to make a judgement about the topic. Despite the brevity of these texts, often less than 20 words per bullet point, we find hedges in both types of article highlights. In this way they foreground their interpretations, acknowledge uncertainty and seek to involve colleagues as participants in the discourse:

(2) Infection contamination during flights ***may*** be caused by direct contact with blood, skin or other body fluids. (CH7) [[5]](#footnote-5)

(3) The potential genetic regulatory network will ***likely*** lead to a better understanding of gene expression for stress response. (RH 168)

Hedges, as shown in Table 2, were significantly more frequent in the Covid-19 highlights (log Likelihood =13.81, p <0.001), which, to some extent, indicates academics’ awareness of the high degree of uncertainty surrounding research into the pandemic. Uncertainty is key to the social management of public health risk (Müller et al., 2021) and hedges point to the degree of caution that should be associated with claims. In the Covid highlights, hedges were more frequently used to express scientific possibility or predication and show considerable uncertainty about the potential measures that can be taken with the coronavirus pandemic:

(4) Secondarily infected cases are ***generally*** milder than the initially infected cases in family cluster cases. (CH 10)

(5) SARS-CoV-2 contamination ***appeared*** to be reduced after treatment. (CH 18)

Here hedging devices mark scholarly caution, and more importantly, to avoid the embarrassment of committing to arguments which later may be proved to be wrong, a particular hazard when dealing with the novelty of the SARS Covid virus (Rutter et al., 2020). At the same time, however, hedges allow authors to foreground their judgements and their role in the scientific creation of facts, spotlighting their role in the scientific process of fact creation. This kind of intervention can be seen here:

(5) Results ***may*** help shed light on the pathophysiology of a prolonged post-viral syndrome following COVID-19 infection.

(6) An association between complicated bacterial rhinosinusitis and COVID-19 infection ***seems likely***

We also found the considerable overlap among the most frequently used hedging item in the two corpora (see Table 3). ‘May’ was the most common item in both lists by some distance, comprising over a quarter of cases in both corpora, reflecting its prominence in science research articles (Author 2, 1996). Because of its perceived formality, this is the only modal which occurs more frequently in academic genres, indicating a 50-50 assessment of possibilities. A more speculative position is taken by the use of the epistemic verb “suggest”, which is also used frequently in both types of highlights. Again, this displays the subjectivity of the epistemic source to weaken commitment or assertiveness. The modal ‘might’ also figures prominently in both sets of highlights, offering writers a more cautious form than ‘may’, often when the condition of realization is more remote (Author 2, 1996). The approximating hedge “estimate” was the second most common item in the reference corpus, offering a judgement of the value or extent of something. Its absence from the Covid highlights suggests, perhaps, the reluctance of writers to be less speculative when reporting new findings on the virus in order to take a firmer stance in selling their arguments.

**Table 3**. The most common hedges in two types of highlights (per 1000 words and %)

|  |  |
| --- | --- |
| **COVID-19 highlights** | **Reference highlights** |
| Item | per 1,000 words | % | Item | per 1,000 words | % |
| may | 3.0 | 27.9 | may | 2.0 | 26.6 |
| might | 0.9 | 8.4 | estimate | 0.6 | 8.0 |
| likely | 0.8 | 7.8 | might | 0.5 | 7.1 |
| could | 0.8 | 7.3 | suggest | 0.5 | 6.2 |
| suggest | 0.7 | 6.2 | could | 0.4 | 5.3 |
| appear | 0.4 | 3.9 | mainly | 0.4 | 5.3 |
| some | 0.4 | 3.9 | seem | 0.3 | 3.5 |
| possible | 0.4 | 3.4 | at least | 0.3 |  3.5 |
| probable | 0.4 | 3.4 | likely | 0.3 | 3.5 |

There was also a clear variation between the corpora in terms of the main types of hedges identified by Hinkel (2005) and Salager-Meyer (1994): downtoners, rounders and plausibility hedges:

* Downtoners are mainly adverbs and mitigate the intensity of a statement (e.g., *almost,* *somewhat*).
* Rounders (e.g., *about, approximately*) indicate a lack of precision and indicate numerical approximation.
* Plausibility hedges are mainly lexical and modal verbs which signal that a claim is based on assumptions rather than evidence (e.g., *suggest, probably*).

**Table 4.** Types of hedges in two types of highlights (per 1000 words and %)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **COVID-19 highlights** |  | **Reference highlights** |  |
|  | per 1,000 words | % | per 1,000 words | % |
| Downtoners | 1.56 | 14.53 | 1.71 | 23.01 |
| Rounders | 0.30 | 2.79 | 0.20 | 2.65 |
| Plausibility  | 8.88 | 82.68 | 5.53 | 74.34 |
| **Total** | **10.74** | **100.00** | **7.43** | **100.00** |

Table 4 shows that downtoners were more frequent in the reference corpus (log Likelihood=-2.1, p <0.74), indicating a judicious use of tentative language to add care and a sense of pseudo-exactitude to results. They indicate a certain caution and convey an unwillingness to be absolute about results (6). When used with a booster, for example, downtoners can display a scholarly detachment to the results (7):

(6) Models with unique IIP and unique EIP for all cycles were ***generally*** associated with the best model fit. (RH 249)

(7) ***Almost*** all isolates showed reduced susceptibility to moxifloxacin(n = 73, 93.6%). (RH 28)

Rounders and plausibility hedges were more frequent in COVID-19 highlights (log Likelihood = 1.08, p <0.37 for rounders and log Likelihood = 14.05, p <0.001 for plausibility hedges), with plausibility hedges dominating the frequencies in both corpora. Rounders express approximation, which can affect the propositional content (Prince et al., 1982). In COVID highlights, they were used as a strategy to avoid taking responsibility for statements due to the lack of knowledge over the virus issue. They help reduce any possible criticism for claiming a spurious precision. Thus, instead of revealing uncertainty or fuzziness, they serve as a shorthand device when more exact details on COVID are lacking:

(8) The time to pneumothorax diagnosis is ***around*** 9.0-19.6 days from admission and 5.4 days after IMV.

(9) ***Approximately*** 34% of healthcare workers display symptoms of post-traumatic stress disorder, and 14% display severe symptoms, during the COVID-19 pandemic. (CH 166)

Plausibility hedges dominate the frequencies in both corpora, and in the COVID highlights they helped to open a dialogic alternative and generate solidarity in terms of shared agreement of certain findings. They are thus a useful strategy of engaging colleagues to collaborate in overcoming the health crisis:

(10) Immune checkpoint inhibitors ***may*** be the better choice for the metastatic cancer patients. (CH 122)

(11) Our results ***suggest*** that K-12 schools are capable of contributing significantly to community transmission. (CH 237)

(12) Decreased renal function does not ***seem*** to be a direct cause of those disturbances. (CH 46)

The use of plausibility hedges in highlights covering other topics were more commonly used to distance writers from their statements and make their subjective views sound more objective. By shifting readers’ attention from the person who presents the statement to research process or findings, plausibility hedges function to shield the writer by avoiding absolute statements.

(13) This study ***estimates*** lung cancer death rates among never-smokers with the NHIS-LMF. (RH 197)

(14) Depression is a common co-morbid condition that ***seems*** to influence the occurrence of psychotic symptoms in PTSD. (RH 183)

(15) High birth rates and low prior vaccination rates ***may*** lead to future outbreaks. (RH 228)

**5.2 Boosters**

While hedges tone down commitment or assertiveness, boosters remove any doubts about claims. They stress shared information, group membership and mark engagement with the audience (Author 2, 2005). In article highlights, boosters can help strengthen the reliability of a proposition and encourage readers to accept the truth or significance of scientific findings:

(16) Preventing viral transmission in airline travel is ***very*** important. (CH 7)

(17) Oocysts are ***extremely*** infectious to intermediate hosts, one oocyst infects with probability 0.46 (0.31-0.57, 95% confidence level. (RH 227)

Boosters comprise a significantly higher proportion of items in the COVID-19 highlights than in the reference corpus (log Likelihood =17.09, p <0.001). This result is consistent with Author 2 and Other’s (2021) finding that research articles on Covid 19 contained more boosters compared with other medical articles. This shows, once again, the clear stance that authors sought to impart to their research in the rather fevered atmosphere of the search for answers to the Covid public health crisis. These example highlights show how boosters were particularly used to promote the originality of the research, emphasising priority and novelty to attract attention:

(18) This is ***the first*** study to compare clinical features between the two diseases. (CH 51)

(19) We conducted ***the first*** large scale research for AI-based LUS analysis of COVID-19 and built an effective framework for COVID-19 diagnosis. (CH 264)

In addition, boosters in COVID highlights help confirm the writer’s commitment to the reliability their propositions and gain readers’ trust as there are even more uncertainties or disagreements concerning the virus issue. Combined with attitude markers, in particular, boosters can carry considerable persuasive force:

(20) The targeted epitope is ***highly*** conserved in all emerged SARS-CoV-2 variants. (CH 130)

(21) Preventing viral transmission in airline travel is ***very*** ***important***. (CH 7)

Boosters do not only differ in frequency across the two corpora, however, but were also used differently. Following Author 2 and Author 1 (2021) we found that each booster acted to enhance one of three functions:

* *Intensity*: strengthens the emotive force of a statement (*extremely, amazing*)
* *Extremity*: stresses the upper point of a scale (*highest, greatest, most*)
* *Certainty*: signals the writer’s epistemic conviction (*definite, prove, show*).

Table 5 shows that all three types of boosters were more frequent in Covid-19 highlights (log Likelihood =1.72, p <0.30 for intensity, log Likelihood =13.34, p <0.001 for extremity and log Likelihood = 5.57, p <0.058 for certainty).

**Table 5.** Types of boosters in two types of highlights (per 1000 words and %)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Covid-19 highlights** |  | **Reference highlights** |  |
| Type of booster | per 1,000 words | % | per 1,000 words | % |
| Intensity  | 3.54 | 30.26 | 2.83 | 37.39 |
| Extremity  | 4.50 | 38.46 | 2.24 | 29.57 |
| Certainty  | 3.66 | 31.28 | 2.50 | 33.04 |
| **Total** | **11.70** | **100.00** | **7.57** | **100.00** |

It is also worth noting that *extremity boosters* account for the greatest proportion (38.46%) of types in Covid-19 highlights and the least in the reference highlights (29.57%). These boosters act to remove any doubts about statements by emphasising the maximum end point of a scale. In doing so, they also function to catch the eye, grabbing the reader’s attention to evoke an emotive response regarding Covid symptoms (22 and 23) or the treatment (24 and 25):

(22) ***The*** ***most*** prevalent long COVID symptoms were fatigue and taste and smell dysfunction. (CH 43)

(23) Muscle pain, fatigue, and fever were ***the most*** common systemic side effects. (CH 147)

(24) Pre-exposure prophylactic treatment had ***the highest*** effectiveness. (CH 234)

(25) The treatment benefit ***was greatest*** when therapy was initiated early during the disease course. (CH 41)

*Intensity boosters*, which add a strong personal endorsement to a statement, were also significantly more frequent in Covid-19 highlights. However, they also appear to be the most favoured types by academics writing in medicine more generally (37.39%). The popularity of intensity boosters among Covid researchers was their value in stressing what the writers wanted present as an established fact or emphasise the efficacy of protective measures:

(26) Human memory B cells encoding ***extremely*** potent neutralizing antibodies are rare (CH 89)

(27) BNT162b2 vaccine with an extended interval between doses is ***highly*** protective (CH 108)

Finally, certainty boosters most clearly show the writer’s epistemic convictions, and these were also more frequent in Covid-19 highlights (log Likelihood = 5.57, p <0.058). This more frequent use is doubtless related to the urgency of making claims as forcefully as possible, imparting an explicit stance to promote a particular ‘solution’ to a Covid-relevant issue. We found that “show” was by far the most favoured certainty booster in the COVID highlights, which is consistent with its wide use in medical journal articles (Ngai et al., 2018; Shen & Tao, 2021). This adds credibility to the research findings and gives readers the confidence to trust new findings:

(28) We ***show*** the benefit of joint unsupervised contrastive and supervised learning of patient labels under the multiple instance learning (MIL) framework. (CH 261)

(29) The present study results ***showed*** that 7.3% of the Covid-19 patients received psychiatric consultations. (CH 168)

**5.3 Attitude markers**

Attitude markers express the writer’s assessment of infor­mation from a more personal, rather than epistemic, perspective. This conveys the author’ individual take on material and conveys the presence of a living, human researcher (Author 2, 2005). Table 2 above shows attitude markers constituted the most frequently used stance feature in both types of highlights, being slightly more common in the Covid-19 corpus (log Likelihood =1.99, p <0.27). This is in line with the deployment of attitude markers in their host journal articles, where Author 2 and Other (2021) found a higher ratio of positive attitude markers in the Covid-19 papers. Attitude markers contribute to the promotion of research by injecting emotional colour into a text to help highlight the value, significance and novelty of statements.

In both sets of highlights they often work to strengthen the rationale for conducting the current study, highlight the originality of the research and encourage readers to approach the longer attached text:

(30) The results show ***impressive*** gains over time. (CH 189)

(31) We present a ***novel*** method to extract and analyse initial exponential outbreak phase. (CH 233)

(32) Among combination indices, [NLR](https://www.sciencedirect.com/topics/medicine-and-dentistry/neutrophil) combined to [CLR](https://www.sciencedirect.com/topics/medicine-and-dentistry/c-reactive-protein) seems the most ***effective*** to predict COVID-19 outcome. (CH 117)

(33) HMC is as ***effective*** and ***efficient*** as NMS in calibrating highly-constrained transmission rates in age–structured SEIR models. (RH 246)

Attitude markers not only help express the writer’s affective evaluation towards a proposition but announce the write’s attitudes in a dialogical way, attempting to align with an audience which hopefully sees the world in a similar way and understands the sentiment behind the statement. In this respect it both conveys a strong stance and makes an appeal to shared beliefs and values (Martin & White, 2005). Once again, this carries the urgency of getting on top of the Covid pandemic, but boosts highlight statements through an investment of personal commitment:

(34) ESR, INR, PT, CRP, D-dimer, Ferritin were the most ***effective*** mortality biomarkers, respectively. (CH 129)

(35) Derived biomarkers were more ***successful*** than previously used biomarkers. (CH 140)

We also identified the most frequently occurring attitude markers in the two corpora. Table 6 shows that “effective” appears at the head of the list for Covid-19 highlights and was more prominent in this corpus. “Key” and “novel” were the most preferred in the reference corpus, with “key” higher compared with the COVID highlights.

**Table 6**. The most common attitude markers in highlights (per 1000 words and %)

|  |  |
| --- | --- |
| **COVID-19 highlights** | **Reference highlights** |
| marker | per 1,000 words | % | marker | per 1,000 words | % |
| effective | 1.3 | 9.4 | key | 0.9 | 7.5 |
| important | 0.8 | 6.3 | novel | 0.9 | 7.5 |
| novel | 0.8 | 5.8 | new | 0.9 | 7.0 |
| significant | 0.8 | 5.8 | important | 0.7 | 5.4 |
| limited | 0.7 | 4.9 | good | 0.5 | 4.3 |
| positive | 0.6 | 4.5 | effective | 0.5 | 3.8 |
| critical | 0.5 | 4.0 | poor | 0.5 | 3.8 |
| poor | 0.5 | 4.0 | complex | 0.4 | 3.2 |
| useful | 0.5 | 4.0 | critical | 0.4 |  3.2 |
| key | 0.4 | 3.1 | meaningful | 0.4 | 3.2 |
| substantial | 0.4 | 3.1 | essential | 0.3 | 2.7 |
| unique | 0.4 | 3.1 | insight | 0.3 | 2.7 |
| new | 0.4 | 2.7 | reliable | 0.3 | 2.7 |
| good | 0.3 | 2.2 | significant | 0.3 | 2.7 |

It is interesting to note that “novel” appears near the top of both lists, stressing the importance of innovation in medical research. Half of the top markers were significantly more prominent in the COVID highlights (*effective*, *significant, limited, positive, useful, substantial and unique)* and four of these do not occur in the general medical highlights at all. *Complex, meaningful, insight* and *reliable* were exclusive to the latter, perhaps conveying a slightly less intense colour to the material they are used to describe.

Dueñas’ (2010) has categorised attitude markers into three types, depending on the aspect of affect they modify:

* assessment (i.e., novelty, interestingness, validity, quality);
* significance (i.e., relevance, importance); and
* emotion (i.e., affective assessments)

Table 7 shows the distribution of these categories across the two corpora. All the three types were more prominent in the COVID corpus, even though the differences were not significant (log likelihood = 0.74, p <0.41 for assessment, log likelihood =-0.60, p <0.57 for significance, log likelihood = 3.33, p <0.16 for emotion).

**Table 7**. Functions of attitude markers across corpora (per 1,000 words and %)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Covid-19 highlights** |  | **Reference highlights** |  |
|  | per 1,000 words | % | per 1,000 words | % |
| Assessment | 11.0 | 82.6 | 10.7 | 88.1 |
| Significance | 2.2 | 16.1 | 1.5 | 11.9 |
| Emotion | 0.2 | 1.3 | 0.0 | 0.0 |
| **Total** | **13.4** | **100.0** | **12.2** | **100.0** |

Attitude marking of assessment is overwhelmingly the most frequent function in both corpora, accounting for more than 80% of all forms. These markers highlight the importance and value of what is reported and work to create a positive stance which might generate a certain enthusiasm to readers:

(36) Research on coronavirus disease 2019 (COVID-19)’s effect on mental health across Europe is ***limited***. (CH 190)

(37) We conducted the first large scale research for AI-based LUS analysis of COVID-19 and built an ***effective*** framework for COVID-19 diagnosis. (CH 264)

The presence of assessment markers in the COVID highlights tended to place greater emphasis on evaluating the novelty, usefulness or validity of the studies they precede, offering writers a more involved and visible stance in the evaluation:

(38) We propose a ***novel*** two-stage transfer learning framework for segmenting COVID-19 lung infections from CT images. (CH 254)

(39) This framework can thus be ***useful*** in the short-term forecasting of epidemics and in the evaluation of potential disease control implementations. (CH 245)

(40) Elevation of Treg cells and basophils are ***unique*** to ventilation recovery (CH 60)

Highlights here promoted the originality of the research and its immediate value, but those in the reference corpus, in contrast, tended to address the potential future value or possible benefits of a treatment:

(41) The anti-PD-1 plus azacytidine might be a more ***promising*** approach to treat GCA. (RH 151)

(42) Two lncRNAs were identified as ***potential*** *novel* biomarkers for cured TB. (RH 55)

(43)Intravenous azithromycin can be recommended as a ***good*** alternative agent when oral doxycycline is contraindicated. (RH 7)

*Significance* markers, indicating the writer’s assessment of importance or application of the findings, were also much more common in the Covid-19 highlights. *Important , significant, critical* and *substantial* all occur in the top 10 most frequent tokens in the COVID highlights (Table 6). It is thus an opportunity for writers to show a clear assurance of the significance of the research or to guide readers to understand the importance of a particular research method:

(44) Findings of this observational study provide ***crucial*** data on experience with hydroxychloroquine therapy,… (CH 40)

(45) Understanding biases within case-based data sources used in epidemiological analyses is ***important*** as they can detract from the value of rich datasets. (CH 241)

(46) There were ***substantial*** increases in out-of-pocket rates and in-hospital case fatality rates. (CH 275)

Attitude markers conveying *emotion* are, perhaps unsurprisingly, largely absent from both sets of highlights and were not found in the reference corpus at all. Where they did occur in the Covid highlights, the attitude tended to be attributed to participants rather than avowed by the writer:

(47) For public health workers, feeling ***isolated and alone*** was associated with increased odds of reporting symptoms of anxiety, depression, post-traumatic stress disorder, and suicidal ideation.

This reflects both the succinctness demanded by the limited space available to convey personal judgements in highlights and the general expectation of researcher objectivity in scholarly writing. Studies of attitude markers in other research genres have revealed a similar lack of expressed affect (e.g. Dueñas, 2010), Author 2, 2005; Author 1 & Author 2, 2022b) as writers seek to sway readers using more disciplinary effective conventions of persuasion.

**5.4 Self-mention**

Self- mention, perhaps the most extensively studied aspect of writer stance, refers to the extent writers project themselves into their texts using first- person pronouns and possessive adjectives (Author 2, 2005). These decisions concerning authorial presence heavily influence how readers recognise the stance writers take towards their arguments and readers. While accounting for the smallest proportion of features in both corpora, self-mention was significantly more frequent in the Covid-19 highlights with 6.2 tokens per 1,000 words compared with 2.11 per 1,000 in the reference corpus (log Likelihood =23.34, p <0.001).

The absence of authors from academic discourses is widely seen as contributing to scholarly objectivity and the exclusion of personal interest in research claims (Marco, 2000; Author 2, 2001). This “disinterestedness” is almost a defining feature of scientific discourse and has traditionally been a cornerstone of effective persuasion in the hard sciences, removing the author to allow facts ‘to speak for themselves’. But conventions of impersonality now seems to be less rigidly adhered to as there is now greater tolerance for subjective forms as part of a wider societal shift toward more engaged and intimate forms of interaction (Author 2 & Other, 2019). Increased authorial presence can strengthen efforts of authors to gain support for their claims by positioning themselves more openly to their ideas and readers. This is also apparent in the highlights.

The substantial difference between the two corpora in the use of first person shows the considerable personal investment the Covid researchers made to establish a clear stance and take responsibility for novel approaches and significant claims:

(48) ***We*** provided an initial epidemiological study of confirmed COVID-19 in Libya. (CH 8)

(49) Here, ***we*** stratify the workforce by industry classification so we can quantify the impact of restrictions on businesses. (RH 228)

These interventions, it should be remembered, occurred in a public health crisis where crucial research to better understand the disease, stem the spread of the pandemic and protect populations was an urgent imperative. Self-mention helped writer’s to present their research narratives in a personalised manner to convey ownership, portray themselves as experts, and so meet the promotional nature of the genre. First person not only claims custody and personal ownership of the content, but was often combined with strong attitude markers to present not only the work reported, but themselves as scientific pioneers:

(50) ***We*** describe for the first time the demographics, epidemiology and clinical of COVID-19 in Brazil. (CH 1)

(51) ***Our*** test offers a deep understanding on the relation between data and model accuracy. (CH 235)

(52) ***We*** propose an effective infection segmentation network, called nCoVSegNet, which takes advantage of attention-aware feature fusion and large reception fields for accurate segmentation of lung infections. (CH 254)

We note that in neither corpus did we find any single-author uses of self-mention. Science is now exclusively a multiply researched endeavour, partly because of the interdisciplinary and complex nature of research. Collaboration and teamwork, in fact, are among the most striking features of research today, with a worldwide trend towards more co-authors affiliated to more universities in more countries. A recent study of over 100,000 papers on PubMed, for example, found the **average number of authors increased from 3 to 6 in the past 20 years** with the percentage of single-authored papers falling from 33.9% in 2002 to 2.1% in 2021[[6]](#footnote-6). As a result, 24% of all articles had international co-authors in 2016 (NSB 2018). This development reflects both the globalization of the performance culture and the ever-growing complexity and expense of conducting modern research, with collaboration a means of sharing technological apparatus, expertise and access to data.

The collaborative dynamic is particularly evident in medicine (e.g., Parish et al., 2018; An et al., 2020) but our highlights data shows it is exceptionally strong in Covid research. The desire of these Covid authors to align themselves with their contributions with plural first person pronouns is clear evidence of the competitive nature of the topic.

**6. Conclusions**

In this paper we have sought to shed light on how academics make use of article highlights to not just signal the content of their research papers but actually promote it through a clear stance. Essentially a cut down abstract, or expanded keywords, highlights are a digital poster, ensuring in the online world that search engines pick up a paper and direct readers to it. We have shown that despite its concision, the genre supports writers’ efforts to present a coherent academic stance. At the same time, we hope to have shown that this stance is relatively topic-centred and sensitive to external contextual factors, such as the urgency, and enhanced reward, of a global pandemic. Focusing on COVID 19 research in leading biomedical journals, we hope to have added valuable insights into both academic stance and the promotional character of highlights.

Our results show that stance markers were significantly greater in the Covid highlights than a reference corpus of highlights on non-covid topics in the same journals. Frequencies were higher in all four stance categories of Author2’s framework, significantly so in all categories except attitude markers which were the most common feature. There was overlap between in the corpora in individual forms, especially among the top hedging devices and attitude markers, which suggests certain disciplinary conventions have evolved in this genre. Overall, however, Covid researchers were less reluctant to make plausible interpretations from their data, more likely to boost the novelty and significance of their research and to claim personal responsibility for their methods and results. We have argued that the fact that these highlights were concerned with the Covid pandemic is the key variable here, encouraging authors to take an unambiguous stance in such a high stakes and frenetically competitive context. The struggle to publish important work that might influence a global health crisis involved, as an important first step, getting attention for this work by a clear authorial stance in highlights.

As a genre required by many journals to accompany a submitted article, and an increasingly important way for promoting the research it contains, highlights have a growing significance in the highly competitive world of scholarly publishing. As a result, our study has potential implications for both understanding academic persuasion and those who might wish to put such understanding to practical use. For researchers interested in academic discourse we have sought to explore a genre which plays an important role in an age where information in usually discovered through search engines rather than scanning individual journals. We have also tried to show how a particular social context can impact the rhetorical choices of an entire discipline, with the urgent challenges of the global pandemic apparently sparking a significant change in persuasive practices. The need to address a major public health emergency that has killed millions of people and had significant impacts on the medical, social, economic and political lives of millions more, created an environment of intense competition to publish important research. It also offered scientists an opportunity to both make a difference and a name for themselves.

Our study also has implications for novice writers and those who teach and mentor them. It provides a valuable, and current, case study of the rhetorical options available to writers and acceptable to editorial gatekeepers. Writers wishing to promote their work by taking a clear and positive stance in their highlights have access to a model of stance choices with the possibilities open to them. Such understanding can also assist teachers to scaffold instruction and raise students’ awareness of how they might modify their stance and negotiate their judgements with an audience.

It is customary to point out the limitations of a study and it will be clear that our research has a relatively narrow scope and a restricted data set. While we have described the expression and role of stance in the relatively understudied genre of article highlights, we have chosen to focus on a particular set of circumstances which cannot be considered normal. Our reference corpus gives a picture of a more everyday use of highlights, but it might be profitable to examine a specific topic in medicine, or in another discipline, to gain a wider understanding of stance in this genre. We also believe that a comparison with abstracts would provide a wider frame for understanding stance in the digitally searchable genres through which scientists increasingly find the papers they wish to read. Another direction for future research is to fill in the gaps left by text analysis by conducting interviews with text users to probe how academics approach writing highlights and how readers react to these features. Finally, future work might expand our study beyond medicine to include stance in highlights in other fields such as business and public health which have had a substantial research interest in COVID issues.

Overall, however, we believe that our study offers a both a robust description of stance in highlights and an understanding of the potential impact of the intense, high-stakes competition generated by the Covid pandemic in biomedical publishing. This picture of how writers orchestrate available rhetorical resources in this new academic pro­motional genre makes, we believe, a useful contribution to the literature on stance, academic discourse and rhetorical persuasion. Perhaps most importantly, it shows how, in these particular circumstances with the rush to be first to make an important breakthrough, the desire to take a strong personal stance seemed to be compelling.

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**Appendix. Source of journals for the highlights**

Annals of Epidemiology

Archives of Gerontology and Geriatrics

Biomedicine & Pharmacotherapy

Cell

Cell Stem Cell

Epidemics

Gene

Heart & Lung

International Immunopharmacology

International Journal of Infectious Diseases

Immunity

Immunology Letters

Journal of Psychiatric Research

Medical Image Analysis

Psychiatry Research

Travel Medicine and Infectious Disease

1. WHO Covid dashboard https://covid19.who.int/ [↑](#footnote-ref-1)
2. https://retractionwatch.com/retracted-coronavirus-covid-19-papers/ [↑](#footnote-ref-2)
3. https://www.nytimes.com/2020/06/14/health/virus-journals.html [↑](#footnote-ref-3)
4. https://www.elsevier.com/authors/tools-and-resources/highlights [↑](#footnote-ref-4)
5. CH refers to the Covid-19 journal article highlight corpus and RH to the reference corpus. The number identifies the text. [↑](#footnote-ref-5)
6. https://quantifyinghealth.com/number-of-authors-of-research-papers/ [↑](#footnote-ref-6)