

“It is important to reinforce the importance...”: ‘Hype’ in medical research articles

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This paper assesses a phenomenon we call ‘hype’ – hyperbolic and/or subjective language to glamorise, promote and/or exaggerate in reporting of research. From a corpus of twenty-four randomized controlled trials (RCTs) in orthopaedic medicine we identified 161 hypes which we categorised for semantic target and linguistic realization. Hypes in RCTs are most prevalent in Discussion sections and most frequently serve to aggrandize the methodology. Findings are discussed in relation to factors including competition, pressure to publish in high-ranking journals and the influence of standardised guidelines.

1. Introduction

Research articles serve not just to inform but also to convince. Consequently, authors may be inclined to employ language which emphasizes, promotes or overstates what they see as positive aspects of their findings, their methodologies or even themselves. Vinkers et al. (2015) find that over the past 40 years there has been an increase in the use of overtly positive adjectives in scientific abstracts in PubMed (e.g. *robust*, *novel* and *innovative*). Similarly, Fraser and Martin (2009) show in medical articles an increase in the use of “value-laden words” to modify knowledge claims which might “bias” the reader’s interpretation. While such language may encourage the implementation of knowledge with beneficial clinical outcomes, it may also impose judgements on readers that undermine objective and disinterested evaluation of new knowledge, and, in the extreme, may represent a form of academic dishonesty.

Randomized Controlled Trials (RCTs) are type of study that aims to minimise bias when testing treatments – in medicine, they are generally regarded as the ‘gold standard’ of and can have a substantial influence on health care practice and policy (Cook et al. 1992). The purpose of this study is to provide quantitative and qualitative descriptions of how authors of RCTs use hyperbolic and/or subjective language to glamorise, promote and/or exaggerate aspects of their research – a phenomenon we refer to as ‘hype’

2. Corpus and Method

The following research questions were addressed: RQ1. To what extent do authors use hypes and how are hypes distributed across reports of RCTs? RQ2. What aspects of their research do authors choose to hype? RQ3. How are hypes linguistically realised?

Our corpus comprised 24 reports of RCTs with comparable subject matter from five leading journals in orthopaedic medicine (75, 927 tokens). Four articles were first independently manually annotated by each of the authors (two linguists,

one specialist in spinal research) for features that we considered as hype. These were then categorised according to their semantic target. Through multiple rounds of discussion, acceptable levels of agreement among analysts were reached. The framework for categorisation of targets is exemplified below (hype highlighted in bold).

Broad Research Area (BRA)

(1) *Accurate identification of the pain generators is **critical**, particularly when ...*

Specific Research Topic (SRT)

(2) *Compared with simple PKP, percutaneous internal fixation with PKP is a **valuable** surgical option for ...*

Authors' Prior Research (APR)

(3) *Since [...] **our original study** in 2005 [...] and the subsequent implementation of **our** findings into practice ...*

Research Methodology (RM)

(4) *Patients eligible for inclusion were those undergoing primary total hip arthroplasty performed by the same **trained** surgeon (E.S.) using a direct anterior approach and*

Research Outcome (RO)

(5) *The latter benefits may be of **particular importance** for elderly patients, ...*

Research Priority (RP)

(6) *The current study provides a **notable** contribution to the literature as being the **first** to demonstrate that ...*

Research Conclusion (RC)

(7) *The present study **succeeded** in demonstrating Level 1 evidence that locally administered depomedrol significantly decreases ...*

Using this framework, each of the remaining twenty articles was then independently analysed by all three investigators. Respective analyses were reviewed and differences were resolved through discussion. Hypes, targets, information on linguistic realisations and article metadata were recorded in a spreadsheet.

3. Results and Discussion

We identified 161 hypes corresponding to 6.7 occurrences per-article, or 2.0 occurrences per 1000 words (henceforth *ptw*) (RQ1). The degree to which authors employ hypes varies considerably. Six articles contain just over 55% (89) of all hypes while two articles contain no instances. The distribution of hypes across sections and targets are shown in plots in Figure 1 (RQ1&2). Hypes are significantly more frequent in Discussions and Introductions (Fig 1A - overall frequency of 3.9 *ptw*, 2.8 *ptw*, respectively). Hypes targeting Research Methodology (RM) and Research Outcomes (RO) are significantly more frequent than other targets (Fig 1B). The variety of targets are greatest in the Introduction and Discussion sections (Fig 1C).

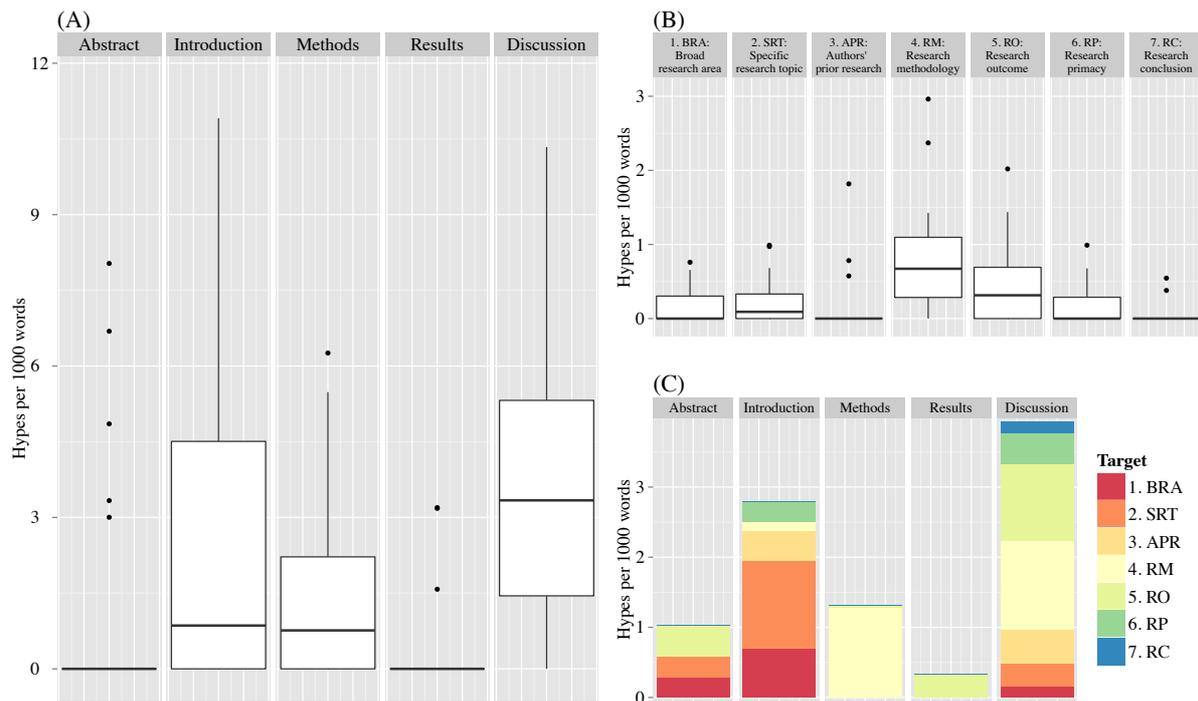


Figure 1: (A) Distribution of hypes in articles by section; (B) Distribution of hypes in articles by target; (C) Distribution of targets across sections

Corresponding to the typical IMRD 'hourglass', the distribution of hypes, both in terms of sections (1A) and targets (1C), appears to be consistent with the amount of rhetorical work we might expect authors to perform at different stages in a research article. That is, the Introduction serves to position the research, thus, requiring a wider range of rhetorical and thematic structures. Accordingly, authors in our sample employ a wide range of hypes. As the Methods and Results sections then narrow to focus on the description of the study, the use of hypes tapers and becomes fewer and more targeted. Finally, in the Discussion, as authors' focus broadens to situate the research in the wider context, make claims and highlight strengths of the study, the use of hyperbolic language is at its highest level in terms of both the quantity and range of hypes – a bottom-heavy hourglass.

Our analyses indicate that hypes in RCTs are strongly associated with research methods. RM hypes with an animate target that serve to emphasise the expertise, qualifications and/or experience of individuals are limited to the Methods section (4, 8 & 9). Hypes in the Discussion tend to be more explicit, often stating a specific aspect of the study design as a 'strength' (10). In medical writing this strategy is not uncommon – indeed, BMJ guidelines recommend that authors devote two paragraphs to the 'strengths and weaknesses'. We suggest both types of statement may be considered gratuitous. For example, it is normal that surgeons are *trained*, *certified* and *expert* (4, 8 & 9), while the underlined elements in (10) highlight study design features which are requirements to qualify as an RCT, and, therefore standard.

(8) *Assisted by 4 experienced nurse investigators (TMJ, LLD, AGM, and SMZ), a board-certified orthotist (CO) (RWT) measured the subjects to determine*

the correct collar size and fitted the collars according to the manufacturers' instructions.

(9) *A primary diagnosis of degenerative or isthmic spondylolisthesis and/or LSS determined by expert spine surgeons.*

(10) *Strengths of this study are the introduction of a novel technique to the performance of ACDF with BMP-2 and its randomized, prospective, blinded, and controlled design ...*

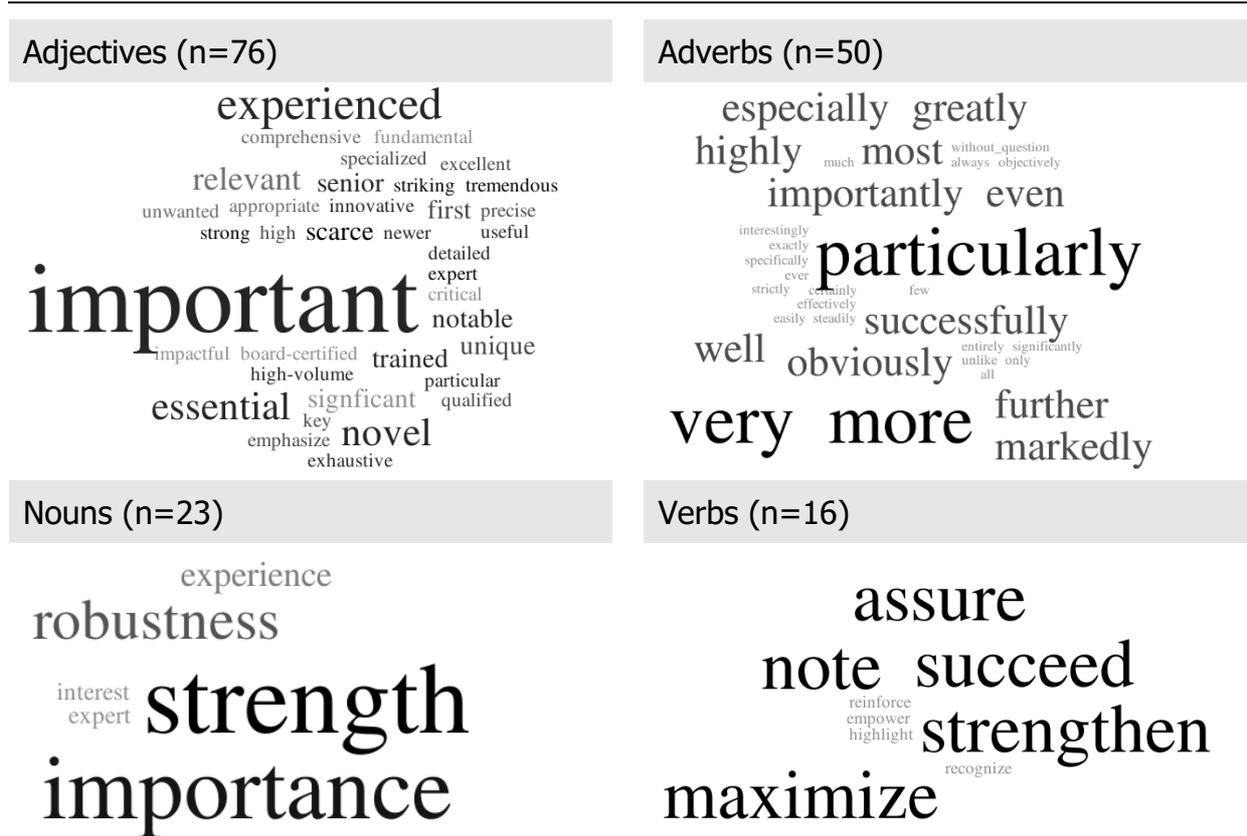


Figure 2: Lexical realisation of hypes (size and shading proportional to frequency)

Linguistic categorisation of the hypes (RQ3) indicates that adjectives, the word class prototypically associated with evaluation (Hunston 2010), are the most frequent form by which hypes are realised (40%), followed by adverbs (23%). The word clouds in Figure 2 give an overview of how hypes are lexically realised. We discuss overlap with linguistic taxonomies of stance and engagement (Hyland 2005). For example, attitude markers (e.g. *important, significant, essential, critical*), boosters (e.g. *highly, greatly, entirely, obviously, it is not hard to see*) and cognitive directives (e.g. *A key issue to recognize ..., It is noteworthy that ...*).

4. Conclusion

Although we find hype in RCTs, it is by no means uniformly prevalent. As a genre of study defined by a set methodology and viewed as the most rigorous study design

(Grossman & Mackenzie 2005), reporting of RCTs is highly constrained. All journals in our sample reference the 'Uniform Requirements' of the International Committee of Medical Journal Editors – these place constraints on format (e.g. IMRAD), content and ethical issues. In addition, all journals reference CONSORT, genre specific content guidelines. Such constraints are likely to restrict opportunity for author self-expression and lead to a genre that is quite formulaic.

Where hype does occur, it is most likely to be targeted at the methods. Given the prestige assigned to RCTs, we suggest that high frequency of hypes targeted at the methodology reflect authors' perceived need to convince editors, reviewers and readers of the rigor of their research. The use of this strategy may, to some degree, be forced on the authors by constraints of the genre, standardised guidelines and journal policy (which at times are contradictory). That is, authors' perceived need to highlight strengths may lead to the inclusion of unnecessary promotion. There is evidence that guidelines can influence authors' linguistic choices, and do not necessarily lead to better reporting (Millar, Budgell & Fuller 2012). While it is beyond our scope to argue for or against the use of such promotional features, we suggest that these findings may inform journal guidelines for authors, editors and reviewers, as well as standardised guidelines.

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