

## Current findings from research on structured abstracts: an update

DOI: <http://dx.doi.org/10.3163/1536-5050.102.3.002>

### Introduction

Ten years ago, I published a paper with virtually the same title as the one above in which I reviewed the findings of over thirty studies on structured abstracts [1]. Here, I comment on developments in the research since that time and the use of structured abstracts over the last ten years.

The phrase “structured abstracts” has now become commonplace, and there is now no real need to define what is meant by the term. Such abstracts typically contain subheadings and sections, such as “Background,” “Aim(s),” “Method(s),” “Results,” and “Conclusions.” Occasionally, there are more subheadings—such as “Sample” and “Limitations”—and occasionally there are fewer. Beller et al. provide useful descriptions of what might be included under each main heading [2].

Structured abstracts were introduced in medical journals in the mid-1980s [1, 2], and since then, their growth has been phenomenal, and they can now be found in several science and social science journals as well as medical ones. Furthermore, conference abstracts are now often submitted, distributed, and published in a structured form.

In my 2004 paper [1], I summarised the published findings as I found them at that time. I reported that, compared with traditional ones, structured abstracts:

- were longer,
- contained more information,
- were easier to read,
- were easier to search,
- facilitated peer review for conference submissions, and
- were generally welcomed by readers and authors.

However, I went on to point out that there were limitations to the research carried out up to that time. The two most important of these were that many of the studies:

- used abstracts that were written or revised by the investigators to form structured and traditional versions (and could thus have an inherent bias), and

- employed undergraduates as judges of the clarity of traditional and structured abstracts (rather than full-time academics and researchers).

Today, because so many more structured abstracts are available, it is now possible to make more refined comparisons. And this is what is done in this comment and opinion piece.

### Method

Basically, I used a nonsystematic review process. I have kept papers on structured abstracts on file since 2000. I selected papers relevant to this comment and opinion piece from this source, and I checked the monthly mailing list that I receive on papers on structured abstracts provided by the BioMedLib Search Engine <<http://www.biomedlibmail.com>>.

### Findings: eight current concerns

What then are some of the areas of concern today? Here, I list eight. Note that these concerns involve research on structured abstracts, rather than on the lengthier abstracts provided in studies of randomised control trials (RCTs) [3]. Some traditional abstracts can be extremely short (Figure 1) and some extremely long.

**Figure 1\***  
Sample short abstract

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*Title:* Can apparent superluminal neutrino speeds be explained as a quantum weak measurement?  
*Authors:* M. V. Berry et al.  
*Abstract:* Probably not.  
*J. Phys. A* **44** 492001 Nov 11 2012

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**Concern 1. Is there an optimal number of subheadings for structured abstracts?** In my experience

about two-thirds of medical journals typically use the five subheadings—“Background,” “Aims,” “Results,” “Limitations,” and “Conclusions”—but about one-third use up to eight subheadings [4]. Problems arise, in particular, when either the heading “Background” or “Aims” is omitted, and authors struggle to accommodate both concerns under the one heading [5].

### Concern 2. Are structured abstracts more accurate than traditional ones?

By this, I mean does the extra length and information provided mean that there are fewer (or more) errors and omissions in structured abstracts than in traditional ones? Early studies that looked at this issue were not conclusive in this respect, largely because so little research had been done [6, 7]. However, more recent studies have reported that there are still errors of commission and omission in abstracts [8, 9]. But it is likely that these errors may be of a different kind; for example, there may be errors in the details provided in structured abstracts that are not presented in traditional abstracts [10]. In my view, it is better to have more detailed abstracts (with the possibility for error) than it is to have informative abstracts that are too bland and that can lead to conceptual misunderstandings.

A related issue here is that if structured abstracts are lengthier and more informative, then this can aid data and text mining [11, 12].

### Concern 3. Are conference and poster papers with structured abstracts subsequently published more frequently than those without them?

This appears to be a relatively new concern. One might predict that using structured or more detailed abstracts would enhance the acceptance of papers for delivery at conferences, and that this might, in turn, enhance their prospects of being published. In this connection, von Hardenburg

et al. examined the fate of more than 700 abstracts delivered to congresses of the German Society of Urology in 2002 and 2009, and found that over 50% of the papers with more detailed abstracts were subsequently published [13].

One difficulty with such research might arise from the possibility that abstracts written for conferences might have been (a) written even before the results of a study had been obtained and (b) then rewritten when the paper was subsequently submitted for publication. Buchan and Stokes highlighted this problem when they reported that, for 171 accepted posters, by the time of publication, the titles had changed in 21% of the cases and the authorship in 25% [14]. They also found differences between the posters and their subsequent publication in their methodologies (4%), results (11%), and conclusions (5%). Indeed, other investigators have reported differences between the abstracts of conference papers and subsequently published papers [15–18], but Rollin et al. found a negative result [19].

**Concern 4. Is it useful to teach students to write structured abstracts for their lab reports and theses?** At least two studies have considered the value of teaching students to write structured abstracts for their lab reports and theses. The first study compared fifty traditional abstracts for first-year laboratory reports written by psychology students at Keele University in 1999 with fifty structured abstracts written by the next cohort in 2000. The study authors found that the structured abstracts were significantly longer than the traditional ones and contained more information, but that this latter difference was not statistically significant. Nonetheless, independent ratings of the abstracts were significantly higher for the structured ones [20]. Psychology students at Keele have since been required to write structured abstracts for their laboratory reports to this day.

In the second study, Budgen et al. compared forty traditional abstracts

written by computer science students at Durham University for their final year projects with forty structured abstracts. These abstracts were then rated by twenty second-year students. The results showed that the structured abstracts were rated as significantly more complete and clearer [21]. Again, structured abstracts are now required for these final year reports at Durham.

**Concern 5. Are there better replication studies than there were?**

Studies gain more power if they can be replicated. In my 2004 paper, replication was considered in the sense of seeing if similar findings were obtained in different studies carried out by different investigators. However, since that date, Budgen et al. have provided a more dramatic study. These investigators worked simultaneously in five different sites: Hong Kong, New Zealand, Thailand, and the United Kingdom (two studies). In each site, sixteen undergraduate participants rated provided traditional and structured abstracts (from the same journal) for completeness and clarity, as well as two other control abstracts in a counter-balanced order. The results showed superior ratings for the structured abstracts over the traditional ones on all five sites [22].

**Concern 6. Are some features of the typographic settings for structured abstracts (and for the first page of articles) better than others?**

The typographic variables used for printing structured abstracts seem to vary as much the variables used for setting the references to journal articles. Some major considerations are the page size, use of different typographic formats to convey the headings (size, weight, italic, and inter-heading space), and positioning of the abstract (e.g., left-ranged or centered). Sydes and I studied readers' preferences for seven different journal page-lay-outs, including titles and structured abstracts [23], and in a separate study, I demonstrated the effects of manipulating these

typographic variables by providing seven versions of the same abstract [24]. It would be good to see if these early studies could be replicated with abstracts from electronic journals.

**Concern 7. Are there any new developments in the ways that abstracts are presented?** I have noted four recent developments in the writing of abstracts that may be of interest.

1. The first of these is the inclusion of *text tables* (brief summary tables within the abstract itself) [25]. Bauchner et al. advocate the use of such tables in the "Results" sections of structured abstracts (and nowhere else) "to convey the key results of the study in question in a clear, concise and effective manner" [26] (p. 491).

2. The second is the development of *graphical abstracts* in Elsevier journals <<http://www.elsevier.com/authors/graphical-abstract>>. Such abstracts are difficult to define, but the authors' notes for the *Journal of Pharmaceutics*, for example, indicate that authors must produce a graphical abstract if their papers are to be considered for publication. (This does not appear to happen often in practice, however.) Readers might search for graphical abstracts for articles in such disparate journals as the *International Journal of Pharmaceutics*, the *Journal of Ethnopharmacology*, and the *Journal of Experimental Social Psychology*.

3. Thirdly, Bauchner et al. suggest that authors use electronic links to key research papers *within* the abstract [26].

4. Finally, Elsevier recently suggested that papers be accompanied by a five-minute audio presentation in which the authors describe their studies and outcomes in their own words.

Other authors have also expanded the notion of structure to embrace structured *discussions* [27], structured *debates* [28], structured *interviews* [29], and structured *articles* [30].

**Concern 8. Are there continuing problems?** Finally, I note three

problems with the current research that I also reported ten years ago:

1. I am unaware of any study where whole papers have been compared (including the titles and the abstracts) as opposed to just the abstracts.
2. It is not always clear whether, in the studies of isolated abstracts, the titles of the relevant articles have been included or not (but Cook et al. [8] and Hartley and Betts [31] provide exceptions).
3. It is still common to find that judgments of the effectiveness of abstracts are mainly made by undergraduates.

### Conclusion

The research on structured abstracts has both been consolidated and improved. The earlier findings—that structured abstracts communicate more effectively than traditional ones—has been substantiated, and new issues and developments have taken place. However, there is still more work to be done, and new developments to be tested.

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