



# The anatomy of an excellent review paper

Emma J. Sayer<sup>1,2</sup>

<sup>1</sup>Lancaster Environment Centre, Lancaster University, Lancaster, UK

<sup>2</sup>Smithsonian Tropical Research Institute, Balboa, Ancon, Panama, Republic of Panama

## Correspondence

Emma J. Sayer

Email: e.sayer@lancaster.ac.uk

## 1 | INTRODUCTION

Review papers are a valuable resource for researchers. For the reader, they are an excellent first port of call to find out about a new subject area. For the author, a review can establish them as an authority in a particular area, and a good review paper can be widely read and highly cited. Unlike most standard research papers, writing a review requires no resources beyond library access, a computer and a great idea. But that does not make writing a good review paper easy; it requires substantial investment of time and thought, and a large dose of creativity. A good review paper not only summarises the current state of knowledge in a particular area, it also synthesises the literature to provide new insights and advance that field of research (Denney & Tewksbury, 2013; Pautasso, 2013; Torracco, 2005; Van Wee & Banister, 2016; Webster & Watson, 2002). So a good review is not just about looking back and summarising what has been done—it is about synthesising knowledge to show the way forward.

There are very few general guidelines for how to write a good review paper because the format and structure are more flexible than that of a standard research paper. The “literature review” many students have to write as a part of their dissertation rarely extends beyond a summary of past studies on a particular subject. Unfortunately, this often shapes our perception of what a review paper is. In fact, there are several different types of review paper (e.g., qualitative, narrative, systematic). Here, I focus on “synthetic” or “integrative” reviews, as published in the journals of the British Ecological Society, and this article aims to help authors who want to write a strong review paper by summarising the essential characteristics of a high-quality integrative review.

## 2 | HALLMARKS OF A GOOD INTEGRATIVE REVIEW

Whether you plan to review methodology, theory, or empirical results, a good integrative review does not just list relevant studies, it brings together the outcomes of past work to create a new whole. A good

review *simultaneously* summarises and synthesises by combining published findings with new ideas to “add value” (Van Wee & Banister, 2016). This added value is usually centred around one or two key concepts, which make a clear contribution to the research area, for example by revealing common patterns, posing novel questions or presenting new directions (see Box 1). The central concepts therefore guide the synthesis of the literature such that the added value permeates the text from start to finish (Van Wee & Banister, 2016). Together, the central concept and the added value form the overarching aim of the review.

In some ways, an integrative review is like an empirical research paper: it has a clear rationale and specific aims, gives an overview to set the context and then presents information in a logical structure to support the central concepts and advance the field (the added value; see Box 2). The key difference is that the supporting information is derived from previously published studies, rather than empirical data.

## 3 | MAKING AN OUTLINE TO DETERMINE THE STRUCTURE

Unlike empirical research papers, there are no fixed criteria for structuring review papers, because the structure is largely determined by the content, but there are some good general principles. Creating an outline is an important step to determine an appropriate structure for a review, and many journals will ask authors for an outline at the pre-submission stage. A well-planned outline not only acts as a general plan for composition, it also provides a mechanism for sequencing your ideas to create a clear and strong narrative (Denney & Tewksbury, 2013; Machi & McEvoy, 2009). A coherent outline is particularly important for review papers with multiple authors because it shows how the individual themes contribute towards the big picture. Indeed, it is essential to have a clear plan for integrating sections written by different people, so your outline should clarify how this will be achieved. The outline needs to be sufficiently defined so you, your co-authors and the journal editor can see how the text structure contributes towards the aims of the review, but as ideas often evolve during the writing process, the outline remains a

**Box 1 In an integrative review, the synthesis of the literature is usually informed by one or more central concepts and results in added value for the research field. Together, the concept(s) and the added value form the overarching aim of the review. Below are some examples of central concepts common to integrative reviews, and the resulting added value**

Central concepts		Added value
New theoretical understanding or an extension of existing theory	→	Creates new directions for research
A bridge between disparate research areas or different strands of information	→	Provides new perspectives or reveals a new phenomenon
Identification of critical knowledge gaps and their implications for the wider field of research	→	Motivates researchers to close the breach with future studies
The application of principles or knowledge from one system/area to another	→	Demonstrates key lines of enquiry or creates testable hypotheses for an understudied subject
An evaluation of different approaches and their relative benefits/disadvantages	→	Facilitates comparisons across studies; proposes standardised methods or quality control criteria

“living” document, with sufficient flexibility to incorporate new developments and sources.

The central concept defines the scope of the paper, so you need to decide on relevant subtopics and themes, working out the logical order to present the information and demonstrate the added value of the review. You can think of the outline as a map, with themes and subtopics as signposts that direct the reader towards your conclusions (Denney & Tewksbury, 2013). Indeed, mapping the links among themes and topics in a conceptual diagram is a great way to help you determine their logical order in the text, and you can also include it as a figure in the paper to help the reader understand how the different strands of information are connected (Pautasso, 2013). It may take some time to determine the logical order of themes within the review; the important thing to remember is that the structure needs to convey a coherent train of thought, which simultaneously gives the reader an overview of past research, while working towards the added value of the review.

#### 4 | THE FLOW OF INFORMATION AND THE LEVEL OF DETAIL

The introduction usually starts with a broad overview, which gives the necessary context for the reader to understand your reasons for reviewing the subject and the overarching aims of the review. The rest of the review is then structured around the central concept, providing relevant information to demonstrate the added value and using subtopics to guide the reader along the way. You can think of this as “funneling” your review: starting out with a big opening and then proceeding to a much narrower and finite end (Denney & Tewksbury, 2013). The flow of information throughout the review is crucial to make this “funneling” work. Your outline placed subtopics in a logical order, and you now need to ensure that the sections of text are more or less seamlessly connected. A good way to

achieve this is to end each section with a “bridge” to the subsequent subtopic.

The appropriate level of detail depends on the focus of the review; for example, if you want to show that your ideas apply across different classes of organisms, you probably do not need to name individual species. Conversely, if your review highlights knowledge gaps in research on a single type of organism, then species identity could be important. Similarly, the number of examples you provide reveals a lot about the strength of your central concept and the added value of the review: if you repeatedly need to give detailed examples to make a point, the reader might question its broader applicability. It is usually more important to show general patterns or disparities across a range of studies than to give the specifics of individual research papers (see also *Common issues and things to avoid*). The added value should help you strike the fine balance between generality and specificity; it is hard to produce new insights if the subject area is too general, whereas an overly narrow focus limits the usefulness of the review to others.

#### 5 | WHAT TO INCLUDE

Your review should provide a balanced account of past research. Unlike a systematic review, integrative reviews are often concise and do not include an exhaustive bibliography of the subject, which makes it all the more important to ensure that you remain objective as you choose which papers, ideas and data to include or omit. You should be able to incorporate studies that do not support your central concept and explain why they do not fit. Ignoring contradictory results or opposing viewpoints will be perceived as a weakness of your review, whereas facing them head-on and providing a plausible explanation can strengthen your conclusions. Although integrative reviews do not usually follow the same strict selection processes for inclusion or exclusion of sources as a systematic review, it is usually wise to include a brief description

### Box 2 General checklist for an integrative review

- Does your introduction include the motivation for the review and explain its contribution to the research field?
- Will your review stimulate and guide future work or provide a new way of thinking?
- Are your propositions clearly justified by theory and past empirical findings?
- Have you summarised and synthesised existing information throughout the text?
- Does the 'added value' permeate the whole text (not just the conclusions)?
- Is the level of detail appropriate and is the number of examples justified?
- Is your review understandable and potentially useful to people outside the immediate subject area?

of your criteria for retaining or discarding pertinent literature (Torraco, 2005), which you can expand upon in an appendix, if necessary.

You should usually aim to span the entire age range of the relevant literature: the oldest sources provide the foundation and background for the topic, whereas recent research papers generally represent the current state of the knowledge. With the convenience of online resources, it is often easy to forget books and older publications that have not been digitised, and some journals actually require that your review is based mainly on current literature, but citing seminal works is essential, both from a contextual and an ethical viewpoint. Given the time-frames involved in the writing and peer-review process, it is prudent to check for relevant online-early versions of accepted papers too (Pautasso, 2013).

## 6 | COMMON ISSUES AND THINGS TO AVOID

An integrative review is not a catalogue of past studies. A weak review strings together results in a way that reads like a list of annotations about individual studies (Denney & Tewksbury, 2013; Webster & Watson, 2002). There is no element of synthesis in "Study X showed A, study Y showed B, and study Z demonstrated C". Similarly, quoting statistics and numbers (e.g., "X out of Y studies show A, whereas Y out of Z show B") does not in itself reveal clear patterns or ideas. Getting mired in the details of individual studies will make you, and the reader, lose sight of the big picture.

A review can also fail to achieve its aims if you devote most of the text to summarising the literature and leave the synthesis until the very end. Remember that the added value should guide the text from start to finish, so leaving the novel ideas or advances for the final conclusions defeats the purpose of synthesising the literature. Make sure that the reader is aware of your motivation for reviewing the topic from the get-go, *summarise and synthesise* throughout the text, and then use the conclusions section to round things up and emphasise the added value of the review (see Box 2).

Beware of trying to produce something that is a cross between an integrative review and meta-analysis, as this often results in a bad example of both types of paper. A meta-analysis is, in many respects, an "extreme form" of integrative review, but it has greater similarity with a research paper because it requires rigorous application of search criteria and quantitative analyses (see Koricheva & Gurevitch, 2014 and other papers in the same Special Feature). It is usually better to choose between a rigorous meta-analysis and a literature review than to try and support a review paper with analyses that fall short of the standards required for a meta-analysis or systematic review. A review can include quantitative elements, but these are often appropriately confined to case studies or illustrative examples.

## 7 | FINAL POINTS

Researchers working in other fields will often turn to review papers to get an overview of an unfamiliar subject, so a good review should be written in accessible language with clear definitions and without excessive jargon (see the *Short Guide to Scientific Writing*; Sayer, n.d.). This is even more important if your review has the potential to stimulate work across distinct research fields. It can be hard to reconcile a focussed subject with the need to make your review appealing to a broader audience, but considering and discussing the relevance of the reviewed topic for other subject areas, species or systems can help you reach researchers outside your field (Pautasso, 2013).

Many integrative reviews take a critical look at past research, and it is important to ensure that your critique is not perceived as a personal attack on the authors of the studies you review. Aim for constructive language that reminds the reader that the objective is to learn from past efforts, rather than criticise individual studies or authors (Torraco, 2005).

Finally, you might want to consider writing an integrative review when you have already done much of the groundwork for another purpose—if you have just organised a symposium or written a grant proposal, chances are you already have a good idea of the key concepts, relevant sources and potential co-authors for an interesting integrative review paper.

### ACKNOWLEDGEMENTS

Many thanks to Jennifer Meyer, Chuck Fox, Alan Knapp, Ken Thomson, Merlin Sheldrake and Andrea Baier for edits and constructive comments, and to Emilie Aime, Lara Ferry, David Gibson, Marc Cadotte and Jos Barlow for their support for the article.

### CONFLICT OF INTEREST

The author has no conflict of interest to declare.

### ORCID

Emma J. Sayer  <http://orcid.org/0000-0002-3322-4487>

## REFERENCES

- Denney, A. S., & Tewksbury, R. (2013). How to write a literature review. *Journal of Criminal Justice Education*, 24, 218–234. <https://doi.org/10.1080/10511253.2012.730617>
- Koricheva, J., & Gurevitch, J. (2014). Uses and misuses of meta-analysis in plant ecology. *Journal of Ecology*, 102, 828–844. <https://doi.org/10.1111/1365-2745.12224>
- Machi, L. A., & McEvoy, B. T. (2009). *The literature review*. Thousand Oaks, CA, USA: Corwin Press.
- Pautasso, M. (2013). Ten simple rules for writing a literature review. *PLoS Computational Biology*, 9, e1003149. <https://doi.org/10.1371/journal.pcbi.1003149>
- Sayer, E. J. (n.d.). The British Ecological Society Short Guide to Scientific Writing. Retrieved from <https://besjournals.onlinelibrary.wiley.com/hub/journal/13652435/journal-resources/guide-to-scientific-writing>
- Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, 4, 356–367. <https://doi.org/10.1177/1534484305278283>
- Van Wee, B., & Banister, D. (2016). How to write a literature review paper? *Transport Reviews*, 36, 278–288.
- Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*, 26(2), xiii–xxiii. <https://doi.org/10.1080/01441647.2015.1065456>