Chapter 15

Review of the Literature

Factoids: Getting (ex)cited

The following factoids are taken from a Nature news feature entitled 'The top 100 papers'.

The measure of a paper's importance is often seen in terms of the number of times it is cited in the works of other scientists. In 1964 the Science Citation Index (SCI) was set up. The index is now owned by Thomson Reuters and the expanded version covers 6,500 top journals in 150 disciplines, from 1900 to the present.

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To rank in the top 100 of the Thomson Reuters' Web of Science (which holds over 58 million items), a paper needs to have been cited over 12000 times.

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Many famous papers are not ranked in the top 100. The majority that are ranked, relate to what are now very frequently used experimental methods or software programs.

*****

The record holder in terms of citations (over 305,000) is held by biochemist Oliver Lowry, whose 1951 paper describes an assay to determine the amount of protein in a solution.

*****

The area that appears to get the most citations is the laboratory techniques of biologists (6 in the top 10 most cited papers).

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In Google Scholar's Top 100 released in late 2014, the top 10 works (6 books, 4 papers) were all published before 1993; and in the top 100, only three were published in the 21st century.

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Google Scholar's most cited paper (around 225,000 citations) was published in *Nature* and is entitled: *Cleavage of structural proteins during the assembly of the head of bacteriophage T4*.

A. Wallwork, *English for Writing Research Papers*,
English for Academic Research, DOI 10.1007/978-3-319-26094-5_15

15.1 What's the buzz?

The extracts below come from the 'review of the literature' section. *Alopecia areata* is the medical term for male baldness (i.e. when a man has lost hair from his head). Although the extracts are fictitious, all the causes and treatments (apart from bananas) listed can be found on 'reputable' sites on baldness.

Analyse how the three paragraphs are structured. What function does each sentence serve within the paragraph?

1. Smith et al (2016) reported that *alopecia areata* may be cured by massaging the scalp with substances such as honey, lemon juice, black pepper and egg yolk. *However*, the application of mango pulp with mustard seeds had only an 18% success rate. We prove that the placement of frozen banana skins for 3-minute periods over the bald patch has a success rate of more than 30%, in fact …
2. In 2017, Jones et al carried out tests using coconut milk, *but* only with a relatively small sample (75 subjects). In our experiments, we used a much larger sample (600 males, average age 44.6), using a blend of almond oil and castor oil.
3. In a previous paper [23] we found that emotional anxiety and intake of fast food were the primary causes of alopecia areata. *In this paper*, *we make a further contribution* by showing that although the consumption of vitamins is considered to be a possible cure, in reality that avoiding certain vitamins not only cures *alopecia areata* but also *alopecia capitis totalis*.

The key to the review of the literature is not to provide a shopping list of past papers. Instead your aim is to state:

1. what others have done or what you did in a previous paper
2. the downside / limit of what they did or why you decided to further the work you did in a previous paper (these limits / additions are highlighted in italics in the sentences above – *however*, *but*, *we make a further contribution*)
3. your solution / improvement

See 11.3 for an example of a review of the literature.

Now complete the gaps in relation to your own research.

Smith et al (2016) approached the problem of _____

by doing _____ .

Our approach is to _____ .

In fact, the advantage of our solution is _____ .

It is a novel approach because _____ .

****

The key skill when writing the Review of the Literature is to provide readers with just the right amount of literature regarding the sequence of events leading up to the current situation – not too much to make it tedious, nor too little so that the context of your research is not meaningful to them. The background information is useful because it allows you to:

- Systematically elaborate the achievements and limitations of other studies
- Relate your new facts and data to these studies

The amount of detail you need to give varies immensely from discipline to discipline. In some disciplines you may be required to have a very strong theoretical framework for your study, thus requiring two or more pages.

In other disciplines just one paragraph may be enough. So another skill is to take into account readers who are up to date with your research area and thus not to delay giving the new information for too long.

15.2 How should I structure my Review of the Literature?

A Literature Review generally answers the following questions, and generally in the following order. You can use the answers to these questions to structure your Literature Review.

1. What are the seminal works on my topic? Do I need to mention these?
2. What progress has been made since these seminal works?
3. What are the most relevant recent works? What is the best order to mention these works?
4. What are the achievements and limitations of these recent works?
5. What gap do these limitations reveal?
6. How does my work intend to fill this gap?

15.3 Do I need to cover all the literature? And what about the literature that goes against my hypotheses?

Unless you are writing a review paper, then you do not need to cover absolutely all the literature. You need to cover the literature that justifies your research and relates to it – both positively and negatively.

By 'negatively' I mean any literature in your specific field that is not in agreement with your hypotheses, approach, and findings. Your aim is not to have a reviewer make a comment such as:

> The authors' literature review was limited to those papers that supported their hypotheses rather than covering all the literature related to the study.

Remember that your mission as a researcher is not to blindly follow just one path in order to reach your specific objective and prove your point. You have to be open to other possibilities and show your readers that there are other possible approaches and other possible conclusions.

15.4 How should I begin my literature review? How can I structure it to show the progress through the years?

Below is an extract from the Introduction to a paper entitled *The Effects of Feedback and Attribution Style on Task Persistence* where psychology student Chris Rozek begins his review of the literature (see 14.6 for how he begins the Introduction).

> Persistence has most often been studied in terms of cultural differences. Blinco (1992) found that Japanese elementary school children showed greater task persistence than their American counterparts. School type and gender were not factors in moderating task persistence. This left culture as the remaining variable.
>
> Heine et al. (2001) furthered this idea by testing older American and Japanese subjects on responses after success or failure on task persistence. Japanese subjects were once again found to persist longer (in post-failure conditions), and this was speculated to be because they were more likely to view themselves as the cause of the problem. If they were the cause of the problem, they could also solve the problem themselves; although this could only be accomplished through work and persistence. Americans were more likely to believe that outside factors were the cause of failure.
>
> These cultural studies hinted that task persistence may be predictable based on attribution style. A later experiment showed that attribution style and perfectionism level can be correlated with final grades in college-level classes (Blankstein & Winkworth, 2004).

The first sentence of the first paragraph introduces the main topic (cultural differences), and the rest of the paragraph briefly reviews a major study on this topic. The implications of this study (culture as the remaining variable) are summarized at the end of the paragraph.

The first sentence of the second paragraph then moves on to the next (in chronological terms) major study. Chris summarizes Heine's work in a way that involves the reader: he uses the verb *speculated* and then continues the next sentence using *if* which gives an example of this speculation.

The first sentence of the third paragraph summarizes the findings of the first two paragraphs in order to introduce some more recent findings.

Note also his use of tenses. In his first sentence, which is a very general overview, he uses the PRESENT PERFECT. Then when he talks about the work of specific authors and makes a summary of each step in the chronology of the literature he uses the PAST SIMPLE.

Chris's structure is thus:

1. introduction to topic
2. support from the literature
3. mini summary
4. introduction to next topic. And so on.

This technique works very well because it tells a story – it is a logical build up to the reason behind Chris's investigation that readers can easily follow. In fact, the final sentence to his Introduction begins: *Because of these findings*, *I hypothesize that* … Chris has gradually prepared his readers for the focus of his work: his own personal hypothesis regarding persistence.

15.5 What is the clearest way to refer to other authors? Should I focus on the authors or their ideas?

There are various styles for making reference to other authors. The four styles below contain the same information, but the focus is different.

STYLE 1 *Blinco* [*1992*] *found* that Japanese elementary school children showed …

STYLE 2 *In* [*5*] *Blinco found* that Japanese elementary school children showed …

STYLE 3 A *study* of the level of persistence in school children *is presented by Blinco* [1992].

STYLE 4 A greater level of persistence has been noticed in Japan [*5*].

In Style 1, the author, Blinco, is given as much importance as what he (i.e. Blinco) found. You might choose this style for one of three reasons: (i) it is simply the easiest style to use and the most readable for readers, (ii) you may want to focus on the author more than what he/she found, (iii) you may want to compare two authors (e.g. *While Blinco says X*, *Heine says Y*).

Style 2 is similar to Style 1, but in this case perhaps you are talking about more than one paper by Blinco, so the paper is the most logical first element in the sentence.

In Style 3, what Blinco found is more important than the fact that Blinco found it. This is a very typical style, but inevitably involves using the passive, which then leads to longer and heavier sentences.

In Style 4 Blinco is not mentioned at all, but only a reference to his paper in parentheses.

The style you use will depend on your journal's "Style Rules", but is likely to contain an element of flexibility. In fact, Chris Rozek's Introduction in Sect. 15.4 uses two styles:

> Heine et al. (2001) furthered this idea by testing …
>
> … can be correlated with final grades in college-level classes (Blankstein & Winkworth, 2004)

He does this to:

- Change the focus from author to findings
- Create variety for the reader

15.6 How can I talk about the limitations of previous work and the novelty of my work in a constructive and diplomatic way?

Sometimes in the Literature Review you want your readers to note the strong features of your work and the limitations of previous works by other authors. If what you propose has never been done before, you can begin your sentence as indicated by the words in italics below.

> *As far as we know*, there are no studies on …
>
> *To* [*the best of*] *our knowledge*, the literature has not discussed …
>
> *We believe that this is the first time* that principal agent theory has been applied to …

If you want to mention the limitations of previous works you could adapt one or more of the following sentences:

Generally speaking patients' perceptions are *seldom* considered.

Results often appear to *conflict* with each other …

So far X *has never been applied* to Y.

Moreover, no attention has been paid to …

These studies have *only* dealt with the situation in X, *whereas* our study focuses on the situation in Y.

To learn more about how to highlight your contribution and discuss the limitations of others see Chapters 8 and 9, respectively.

15.7 What tenses should I use?

The PRESENT SIMPLE (S1) or PRESENT PERFECT (S2) are generally used to introduce the literature review.

S1. In the literature there *are* several examples of new strategies to perform these tests, which all *entail* setting new parameters [Peters 2001, Grace 2014, Gatto 2018].

S2. Many different approaches *have been proposed* to solve this issue.

Use the PRESENT PERFECT again to refer to ongoing situations, i.e. when authors are still investigating a particular field. Even though specific past dates are mentioned in S3 and S4 below, these dates are part of a series of dates that describe situations that researchers are still working on today and will continue in the future.

This means that PAST SIMPLE cannot be used in any of these three cases.

S3. Since 2016 there have been many attempts to establish an index [Mithran 2017, Smithson 2018], but until now no one has managed to solve the issue of ….

S4. As yet, a solution to Y has not been found, although three attempts have been made [Peters 2001, Grace 2014, Gatto 2018].

S5. So far researchers have only found innovative ways to solve X, but not Y [5, 6, 10].

In S3–S5 note the underlined words. These are adverbials of time that are typically used with the PRESENT PERFECT because they indicate something that began in the past (i.e. when research first began in this area) and continues into the present.

The PRESENT PERFECT is also used when talking about research that was carried out at some indefinite time in the past, or when the moment it was carried out is of no relevance for the purposes of the present paper.

S6. It *has been shown* that there is an inverse relation between the level of bureaucracy in a country and its GDP.

S7. Other research [Green, 2018] *has proved* that bureaucracy can have a negative impact on incentivizing companies to adopt environmental measures.

Although in S6 there is no reference, the author is implying that the 'inverse relation' was not found by him/her, but by another author. In any case, it is always advisable to put a reference. If the present tense had been used ('it is shown') then the reader would think that the author is talking about the present paper.

S7 indicates a case where an explicit date is given in the reference (i.e. 2018), but for the author of the present paper it is the finding (i.e. bureaucracy's negative impact) that is the key point rather than the date this finding was reported in the literature.

You must use the PAST SIMPLE when:

- The year of publication is stated within the main sentence (i.e. not just in brackets)
- You mention specific pieces of research (e.g. you talk about initial approaches and methods that have subsequently probably been abandoned)
- You state the exact date when something was written, proved etc.

In S8–S10 below we are talking about completely finished actions, so the PRESENT PERFECT cannot be used.

S8. The first approaches used a manual registration of cardiac images, using anatomical markers defined by an expert operator along all images in the temporal sequence. Then in 1987, a new method was introduced which …

S9. This problem was first analyzed in 2014 [Peters].

S10. Various solutions were found in the late 1990s [Bernstein 1997, Schmidt 1998].

In all other cases, the simplest solution is to follow the style of the examples below.

S11. Lindley [10] investigated the use of the genitive in French and English and his results agree with other authors' findings in this area [12, 13, 18]. He proved that …

S12. Smith and Jones [11, 12] developed a new system of comparison. In their system two languages are / were compared from the point of view of … They found that ….

S13. Evans [5] studied the differences between Italian and English. He provides / provided an index of.. He highlighted that …

In S11–S13 the first verb introduces the author and is typically used in the PAST SIMPLE. Other similar verbs are, for example: *examine*, *analyze*, *verify*, *propose*, *design*, *suggest*, *outline*.

Note that the first verb in S11–S13 could also be in the PRESENT SIMPLE. However, generally when the PRESENT SIMPLE is used the construction is slightly different (S14): first the reference and then the author.

S14. In [5] Evans studies the differences ….

In any case, even in S14 the SIMPLE PAST (*studied*) would be fine.

The second verb in S11–S13 describes what the authors found. In S9 *agree* is logical because Lindley's findings still agree today with the findings in the papers referenced at the end of the sentence. In S12 and S13, both PAST SIMPLE and PRESENT SIMPLE are possible. However, it is common to use the PRESENT SIMPLE when describing how a system, method, procedure etc. functions. In S12 the PRESENT SIMPLE underlines that Smith and Jones are still using their system and that it is still valid. The use of the PAST SIMPLE (*were compared*) in S12 would probably imply that Smith and Jones' system is not in use anymore and it was just a step in this road of research that has subsequently been superseded.

The third verb in S11–S13 indicates what the author managed to do (*find*, *obtain*, *prove*, *demonstrate*, *highlight*), and typically such verbs are used in the PAST SIMPLE (*found*, *obtained* etc.). Again, however, some authors use the PRESENT SIMPLE in such cases.

Use the PRESENT SIMPLE to discuss previously published laws, theorems, definitions, proofs, lemmas etc. Such published work is generally considered to be established knowledge and the use of the PRESENT SIMPLE reflects this.

S15. The theorem *states* that the highest degree of separation is achieved when …

S16. The lemma *asserts* that, for any given strategy of Player 1, there is a corresponding …

15.8 How can I reduce the amount I write when reporting the literature?

Redundancy is often high in the review of the literature, as highlighted in the OVs below.

	ORIGINAL VERSION (OV)	REVISED VERSION (RV)
1	Long sentences *are known to be* characteristic of poor readability [Ref].	Long sentences *are* a characteristic of poor readability [Ref].
2	*In the literature* the use of long sentences *has also been reported* in languages other than English [Ref].	Long sentences *are* not exclusive to English [Ref].
3	The use of long sentences *has been ascertained* in various regions of Europe during the Roman period [Ref].	Long sentences *were used* during the Roman period in various regions of Europe [Ref].
4	The concept of author-centeredness *has been suggested as playing* a role in the construction of long sentences [Ref].	Author-centeredness *may play* a role in the construction of long sentences [Ref].
5	*Several authors have proposed* that in scientific writing the occurrence of a high abundance of long sentences *is* correlated to … [Ref].	In scientific writing the occurrence of a high abundance of long sentences *may* be correlated to … [Ref].

The OVs are not bad English, and if you use them occasionally they are absolutely fine. However, if you always refer to the literature in this way you will create a series of unnecessarily long sentences with considerable redundancy. This makes it hard for the reader to immediately identify the key points of the literature.

Nearly all the words in italics in the OVs could be removed. This is because the reader knows from the reference ([*Ref*]) at the end of the sentence that you are discussing another author's work or one of your previous papers. See Chap. 7 on how to make a clear distinction between your current work, your previous work and the work of others.

However, if you do remove the words in italics, you still have to indicate whether something is known to be true (OVs 1–3), or is simply a suggestion or a proposal (OVs 4–5). For things that are known to be true today (RVs 1–2) you can use the PRESENT SIMPLE, and for things that are known to be true regarding the past (RV 3) you can use the PAST SIMPLE. To indicate that something has been suggested or proposed, you can use *may* (RVs 4–5). Because you have put the reference, your use of *may* indicates a general feeling in the community and not exclusively your feeling.

15.9 Summary: How can I assess the quality of my Literature Review?

To make a self-assessment of your Literature Review, you can ask yourself the following questions.

- Have I shown that I am familiar with the state of the art.
- Have I mentioned only what my readers specifically need to know and what I will subsequently refer to in the Discussion?
- Have I avoided only mentioning the literature that supports my hypotheses?
- Are the papers I have mentioned in a logical order? Is it clear why I have chosen these papers and not others?
- Have I selected a disproportionate number of papers from my own country?
- Have I ensured that there are no papers cited in the bibliography that are not cited in the paper, and vice versa?
- Have I followed my journal's instructions regarding how I make references to the literature? Where possible have I done this in a variety of ways?
- Have I removed any redundancy when reporting the literature?
- Have I used tenses correctly? PRESENT SIMPLE (descriptions of established scientific fact), PRESENT PERFECT (at the beginning of review to give general overview; for past-to-present evolutions), PAST SIMPLE (when specific dates are mentioned within a sentence; for the verbs that introduce an author's findings)