

Synthesizing Sources – the CYA strategy for ethical writing in the sciences

Why learn to synthesize sources? Because, in sciences, quoting is frowned upon. Using a direct quote brings undue attention to language when science would prefer we concentrate on ideas. One of the best guides to understanding ethical writing and avoiding plagiarism is Miguel Roig's [*Avoiding plagiarism, self-plagiarism, and other questionable writing practices: A guide to ethical writing*](#). Currently, Dr. Roig makes his work freely available as either an .html document or a word document that can be saved (if used for a class, please write and ask Dr. Roig's permission). In brief, Roig points out a paradox in science writing that is notoriously difficult to address:



This writing conundrum is further complicated by his other suggestion which is to build expertise before you write...this is kind of difficult to do when writing is often required long before expertise is attained! Further, there is some good evidence that writing itself encourages the development of knowledge meaning that pedagogically (from a teaching standpoint), you will need to write in order to learn what it is you are writing about.

What is a writer to do? The answer is **SYNTHESIZE SOURCES**. When you discuss the literature on a topic, you have the responsibility to read more than a single source for your information. Gone are the days of *Wikipedia* and *Encyclopedia Britannica*. You must actively integrate your sources. Why? You stand a lesser chance of committing unintentional plagiarism if you use more than one main source for your work. If 4 people have basically said the same thing, then when you say it – and cite all 4 sources – you are “proving” the publication history behind the idea and the reader is more confident that you know what you are talking about. Multiple citations are most common when providing definitions, discussions, and explanations of a topic.

MFAQs:

- What about “common knowledge”?
 - Part I: For safety's sake, nothing that you learned after the twelfth grade counts as common knowledge. If you are just beginning to study in your field, then EVERYTHING you read for the first time is new to you. Further, because you don't have the expertise to judge whether something should be considered common knowledge in your field, you need to cite more rigorously than you will a few years from now. Keep in mind, though, that virtually every article even on a well-researched topic begins with a brief definition, even when the writer expects the readers to know what the subject is. This is part of the way that writers prove their credibility as well as mark the boundaries of their own intellectual allegiances.
 - Part II: Should you stay in research, you will find that you cite less as you gain expertise. In fact, by the time you get your PhD and move toward frequent publication, you are expected to cite “appropriately”; over-citing marks you as an amateur. But until you get your PhD and/or publish frequently enough to be widely considered an expert, you should cite abundantly.
- “I feel like I'm citing every sentence!”
 - Well, yeah, for the reasons stated above! This is particularly true of Introductions and Discussion sections in research reports, and all the parts of a Review Papers, except the conclusion. In a research report, the only original information is in the Research Question, possibly the Method, the Results, and some portion of the Discussion. In a Review paper, which

is by definition a critical synthesis of the research literature on a topic, the ONLY original contributions the author makes are 1) the critique and concluding recommendations; 2) the work of putting together all the sources; 3) the organization of information itself (a new or different perspective on a topic is one of the finest contributions a scientist can make).

General Tips for Synthesizing Sources

- 1) Organize task by deciding what information you are looking for (Definitions? Arguments? Practices? Theories?).
- 2) Mark similar information from each source in same manner (use the same color pen to highlight or underline; use a number system, etc.). So, mark all the information which is a definition in the same way, then all the examples, then the explanation, etc. If that is too complicated for the text, then mark information that you know is central and information that you are pretty sure is peripheral in different ways.
- 3) Make lists of information which is shared among sources
 - a. List 1: summary of info that is in all sources (probably means this is CENTRAL information)
 - b. List 2: summary of info that is in some sources (could be CENTRAL, could be PERIPHERAL)
 - c. List 3: separate lists of info that is NOT shared among sources (probably PERIPHERAL -- meaning, specific to the source you are reading, but not necessarily to your research)

4) Write your explanation incorporating the information from Lists 1, 2, and 3 -- overall, it's best to start with the information shared by all the sources, and then incorporate less shared information. Peripheral information should be included last, if at all. If what you really need to provide the reader is a solid foundation for understanding the concept, then peripheral (idiosyncratic) information is confusing. On the other hand, if you are providing an in-depth discussion of something, then idiosyncratic information has a place in the writing.

Suggestions for Citations: Put citations where they make the most sense (from McMillan, 2006, 149):

“Whichever documentation system you use, put each citation close to the information you wish to acknowledge. Do not automatically put cited material at the end of every sentence. For example, the following style...is ambiguous:

Pollination of *Linaria vulgaris* has been studied in both the field and the laboratory (Arnold, 1962; Howard, 1979).

Did Arnold do his studies in the field and Howard in the laboratory? Or Howard in the field and Arnold in the laboratory? Or both authors in both settings? Moving the first citation clarifies the situation:

Pollination of *Linaria vulgaris* has been studied in both the field (Arnold, 1962) and the laboratory (Howard, 1979).

If you actually meant to say that both Arnold and Howard did both types of study, then you are better off rewording the sentence:

Arnold (1962) and Howard (1979) have studied the pollination of *Linaria vulgaris* in both the field and the laboratory.”

Practice! Use the excerpts below to practice synthesizing sources. Use appropriate APA style for in-text citations.

Explanation: (separation) anxiety disorder and school refusal

Kearney, C.A. (Oct 2005) Addressing School Refusal Behavior: Suggestions for Frontline Professionals. *Children & Schools*, 27 (4): 207-16 (excerpt from page 207)

Youths with school refusal behavior show a wide range of internalizing and externalizing behavior problems, including depression, general and social anxiety, fear, fatigue, somatic complaints, noncompliance, aggression, clinging, temper tantrums, and refusal to move, as well as running away from school or home (Kearney, 2001). In many cases, school refusal behavior is highly comorbid with some mental disorders, especially separation and generalized anxiety disorders, oppositional defiant disorder, and depression (Kearney & Albano, 2004).

Hanna, G.L., Fischer, D.J., Fluent, T.E. (2006) Separation Anxiety Disorder and School Refusal in Children and Adolescents, *Pediatrics in Review*. 27:56-63

Separation anxiety disorder (SAD), however, is a common childhood anxiety disorder that often involves persistent problems with attending school or other activities away from home because of fear of separation. The fear associated with leaving the safety of parents and home may escalate into tantrums or panic attacks and cause significant interference with academic, social, or emotional development. (pg. 56)

Studies assessing childhood anxiety disorders have repeatedly demonstrated that children who have SAD often have other psychiatric disorders. In clinical samples of children who have SAD, approximately 50% are diagnosed with at least one other anxiety disorder and 34% with a depressive disorder. Studies of depressed prepubertal children have found concurrent separation anxiety disorder in 40% to 60% of subjects. When SAD and a depressive disorder coexist, SAD precedes the depression in approximately 67% of cases. (pg. 58)

Definition: Laminectomy

Harvey, C.V., (Nov 2005) Spinal surgery patient care. *Orthopaedic Nursing*, Vol. 24, Issue 6 (excerpt from page 433)

Laminectomy

This is the removal of part of the laminae and possibly a portion of the ligamentum flavum, facet joints, and any protruding osteophytes to allow room for nerve roots and to expose the abnormal part of the disc. This is often enough to decompress the affected nerve and relieve the symptoms. Pain relief is often not instantaneous postoperatively because it takes time for the inflammation to the nerve to subside. This is effective with spinal stenosis (Best, 2002).

Chen, A.L. and Spivak J.M. (Aug 2003) Degenerative lumbar spinal stenosis: options for aging backs. *Physician & Sportsmedicine*, Vol. 31, Issue 8 (html, section “Operative Management,” paragraphs 4 & 6)

Laminectomy. The standard decompression procedure, called laminectomy, involves removal of the spinous processes and central portion of the laminae overlying the affected stenotic segments (figure 4). Hypertrophic arthritic facet joints are shaved to relieve compression along the central spinal canal, lateral recess, and neural foramen as needed.

The results of standard operative decompression for lumbar spinal stenosis are encouraging. One metaanalysis showed an average of 64% of patients had a good or excellent outcome after surgery.^[sup26] Operatively managed patients have significantly better outcomes at 1-year evaluation when compared with nonoperatively treated patients, despite the fact that operative candidates tended to have increased symptoms before surgery. Risk factors associated with a worse outcome after operative management include diabetes mellitus, osteoarthritis of the hip, preoperative degenerative scoliosis, and preoperative lumbar fracture.^[sup27,28]

Atlas, S. J., Delitto, A. (Feb 2006) Spinal Stenosis: Surgical versus Nonsurgical Treatment. *Clinical Orthopaedics and Related Research*. Volume 443, 198-207 (excerpt from page 202)

Laminectomy

Broadly, surgical treatment is designed to alleviate compression on the neural tissues in the central canal and/or lateral recesses. Decompression or laminectomy of the lumbar spine at one or more levels has been the standard treatment for spinal stenosis involving the central canal despite little evidence from comparative trials of nonsurgical treatment or alternative surgical interventions.²⁹ The operative challenge is to provide adequate decompression of the neural elements while maintaining spinal stability. Iatrogenic instability can be decreased by preserving the facet joint and the pars interarticularis. A variety of different surgical techniques, including laminotomy, laminarthrectomy, laminoplasty, and microscopic decompression have been reported with a general goal of providing adequate clinical outcomes with less invasive decompression.^{61,72} However, the relative effectiveness and complications of various decompressive procedures remain uncertain.³⁰

There are no large randomized studies to show the relative benefit of surgical decompression compared to nonsurgical treatment. Short-term results from a randomized trial presented to date only as an abstract report improved outcomes associated with surgical treatment.⁵⁴ Among published studies, a single randomized study compared 13 surgically treated and 18 nonsurgically treated patients with spinal stenosis.² Although Amundsen et al ² reported better outcomes with surgery, 56% of nonsurgically treated individuals crossed over to surgery after a median of only 3.5 months, outcomes were judged by physicians not patients, and no statistical comparisons were done.