Literature Synthesis Writing Guide

Arranged in alphabetical order

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Chapter 1

Book Overview and Searching Databases with Key Terms and Words

BRT

behavioral research & teaching

Book Overview

In the following book overview, we describe each chapter as an incremental step in the writing process. Though they are incremental and sequential, resulting in individual components of the synthesis, they come together in your completed paper from the beginning to the end. The book provides a guide for completing a synthesis, not a description about a synthesis.

Chapter 1 – Searching Databases with Key Terms and Words
Chapter 1 provides an overview of the book, as well as outlines the necessary first steps when beginning to craft a thesis: finding relevant and applicable literature; including helpful databases and literature searches to acquire sufficient sources.

Data Bases
Key Terms and Words
Sample Search Process: Library Resources – Ultimate One Stop Shop and Search Strategies
- General Databases
- Subject-Specific Databases
- Format-Specific Databases
- Trouble Accessing Full Text Materials
- Keywords: Define Concepts Focused on a Research Question.

Book References

Chapter 2: Harvesting Authoritative References: Journals and Researchers
Chapter 2 addresses the steps necessary before formulating a synthesis and beginning the writing process. This chapter provides useful resources and databases provided through universities that must be utilized to acquire relevant studies and literature. This chapter lists publication types and outlets as well as impact factor and h-index for researchers to aid in compiling thorough background research to formulate a synthesis and that is related to what is discussed in the paper.

Authoritative References Publication Types and Outlets
Two Final Considerations
- Impact Factor
- h Index for Researchers

Citations Management Tools
Book References

Chapter 3: Synthesizing versus Summarizing
This chapter differentiates between synthesizing and summarizing, and the process of summarizing information found during the research period. Chapter 3 will address the three strategies for placing literature within your paper: the Meta-analytic Approach, the Tabular Approach, and the Theoretical/Conceptual Approach. Finally, Chapter 3 ends with discussing how to move from synthesizing to formulating an argument.

Moving from the Search to Synthesis
Three Strategies for Placing Literature
- A Meta-analytic Approach
- A Tabular Approach

A Theoretical/Conceptual Approach
From Synthesis to Argument
Book References

Chapter 4: Develop a Perspective by Framing an Argument
This chapter will help you develop argumentative writing, anchoring your synthesis into an argument that was based on a perspective, a well-disciplined point of view. Chapter 4 will dive into the specifics of different types of approaches, including the formal argument using the Toulmin model, as well as inductive and deductive reasoning.

Formal Arguments using Toulmin Model
• Grounds
• Warrants
• Backing
• Modal Qualifiers
• Claims
• Rebuttals
A Logic Example – Equal Pay
A Research Example – Transition Matrix
Deductive and Inductive Reasoning
A Comparative Example – School Consultation Training Program
Summary
Reflections on Arguments
Book References

Chapter 5: Develop Structure and Flow: Reasoning, Headings, and Transition Devices
The focus of this chapter is on structuring the literature synthesis using explicit techniques that weave references and terminology into a convincing argument. This chapter discusses structure techniques that create seamless reading and understanding. Chapter 5 lists reasoning, headings, and systematic transition devices as essential tools that create a logical and well-structured thesis.

Structure through Reasoning
Sequential Reasoning through Voice and (Implicit) Pronoun Perspectives
Headings Control Structure (via APA Style Guide)
Pivot Structure with Transitional Phrases (Key Terms and Linking Words)
Key Terms
Transitional Phrases
Linking Words (Possel, 2013)
Purdue Writing Lab – Transitional Devices (Purdue University, undated)
University of North Carolina – The Writing Center (Center, Undated)
Transitional Words and Phrases – Writer's Web (Taraba, Undated)
Writing with Clarity and Style (Harris, 2003)
Book References

Chapter 6: Clear Start, Strong Writing, and Conclusive Ending
Once the rough draft is complete from previous chapters, chapter 6 focuses on both the opening and the concluding paragraph. This chapter will also help with making sure your paper has the storyline and the argument. Focusing on writing with strength that sweeps through the structures, headings, and transitions from your previous draft to a near-final draft.

Between Sections and Paragraphs
Within Sections and Paragraphs
Language Specificity
Writing the Introductory Paragraphs
- Opening Context Paragraph(s)
- Main Argument Paragraph(s)
- Data Base Search with Key Words
- Organizational Paragraph to the Synthesis

Landing on the Methods Section
Book References

Chapter 7: Method Section
This chapter lays out how to effectively construct the methods section of a thesis. This chapter focuses on how you plan to collect data, either quantitative or qualitative, to provide sufficient evidence that supports your claim. In this chapter, the strategies you propose must be flexible, as changes may be needed when the time comes to implement the study.

General Issues for a Method Section
Specific Issues for a Method Section
- Settings
- Participants (Subjects).
- Terms and Operational Definitions
- Measures
- Scales
- Score Distribution
- Response Type
- Decision Analysis
- Time Series Longitudinal Data

Reliability-Validity
- Reliability
- Validity

Data Collection Procedures and Quality Assurance
APA Guidelines in Data Reporting
Book References

Chapter 8: The Discussion Section Written in Anticipation
Chapter 8 outlines helpful considerations when crafting the discussion section of the paper. Including pre-reflections, avoiding conjectures, reviewing literature that will be used are all helpful tools to strengthen the discussion section. This chapter distinguishes between reporting and explaining the outcomes of the research, a necessity for the discussion section. Finally, this

chapter outlines confirmatory and dis-confirmatory explanations that must be included to tie back to the argument of the paper. Of course, the discussion depends on data (results) so this chapter is in anticipation and likely needs to be re-written when you have completed your study.

Variables to Consider in General
Five Types of Validity (from Standards, 2014, pages 11-22)
Specific Standards
- Cluster 1 – Establishing Intended Uses and Interpretations
- Cluster 2 – Issues Regarding Samples and Settings Used in Validation
- Cluster 3 – Specific Forms of Validity Evidence

Design Issues and Threats from Shadish, Cook, and Campbell (2002)
- Construct Validity
- Internal Validity
- Statistical Conclusion Validity
- External Validity

Phrases Useful for a Discussion Section
Book References

Chapter 9: Flight Check for Finalizing the Literature Synthesis

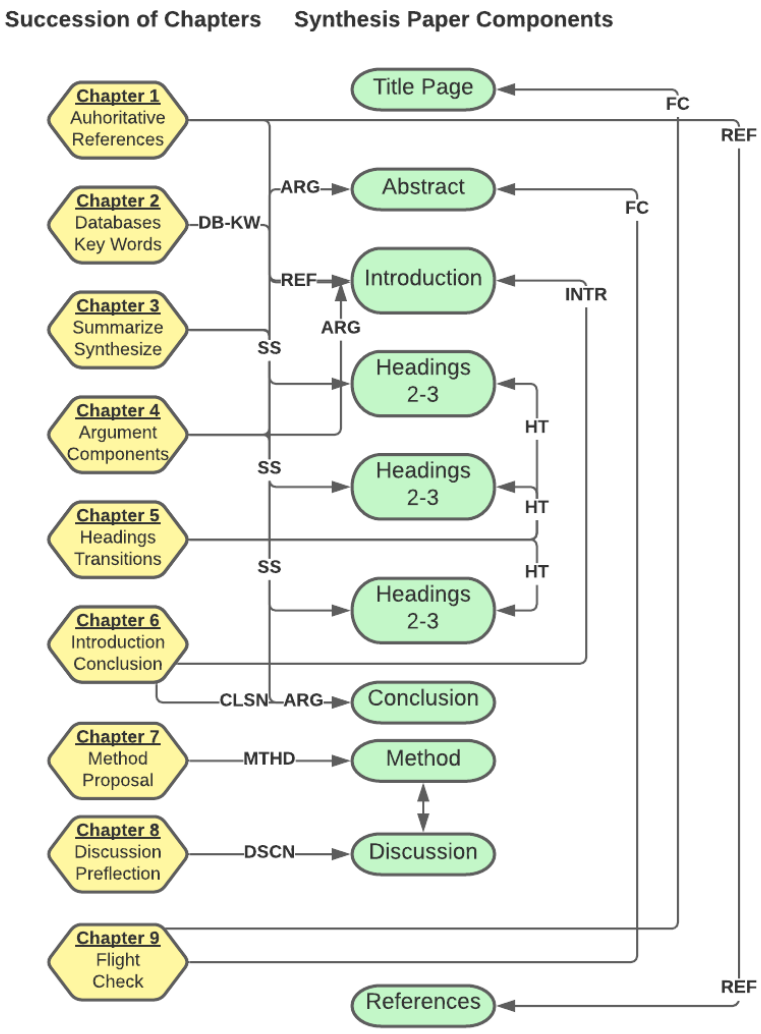
The purpose of this chapter is finalizing the thesis by developing three final components: the title page, abstract, and references. The focus is wrapping up the writing, making final edits, and submitting a final draft. In this process, the structure and language must be revised and *must* be comprehensive to the entirety of the paper. Finally, Chapter 9 emphasizes the consideration of accuracy and correctness in the final paper to ensure the approval and validity of the thesis.

Language Usage
Nits and Picks
The APA Patrol: The Final Three Components
- Title Page
- Abstract
- References

Summary of Final Flight Check
Book References

Searching Databases with Key Terms and Words

We wrote this book to build your synthesis in an iterative manner, starting with Chapter 1, that describes a *database search* using *key words* of the research in your field to feed the middle and main section of your paper and then build out the front and back. We also provide a *sample search*. In the end, you can see this structure in the brief description of each chapter to organize and sequence the content of your paper. This chapter first provides an orientation to the remaining eight chapters, which can be used to complete a literature synthesis for either a doctoral dissertation or master's thesis.



Before you begin writing, it is important to have done a thorough background research in the field, whether your study will focus on children with special needs in Grade 3 or high school dropout rates in Cincinnati. The first step is to find the relevant information. In the first chapter, you will be guided through the process of finding relevant studies using the library resources provided by the university, along with tools to keep track of all the articles you have found, and citation software to be accurate in the process. It includes helpful tips and guides that can ground your synthesis and provide necessary literature reviews to have a strong, persuasive paper. This search process begins with the use of key words to find relevant research.

Appendix A – Words are not Just Words: The Professor and the Madman

In this chapter, we also have included several supportive resources for you, again keeping in mind that this book is a guide and a source for you to exploit for your unique applications. These resources are digital, including databases that can be linked directly from the chapter as well as bibliographic software: (a) Zotero, (b) Mendeley, and (c) EndNote 20.0. These systems are described in Chapter 2 and are useful for organizing your personal database of references. In

Chapter 9, writing templates are introduced for using APA style to remove the burden of memorizing arcane rules of style. Perhaps most importantly, we include a software platform to use as a meta-cognitive tool in planning your writing (https://writerightnow.com). We integrate this writing analysis software as part of the teaching and writing process, highlighting the conceptual nature of writing useful in planning all sections of the dissertation/thesis. This tool is also designed to provide you immediate feedback on these key concepts and vocabulary that need to be part of your actual writing. We propose using this software as part of free writing: See Elbow (1973) in which you write without distraction or editing as a pre-draft document: Thinking, reading, and talking about writing is not writing. Writing is, well, writing. For each chapter, we provide both the writing prompt and an example response, so you are not left guessing about how to plan (**Appendix B**). These responses are based on two published articles that are used repeatedly throughout the book so you can dissect them systematically over the time: Tindal, Nese, and Stevens (2017) and Tindal, Irvin, Nese, and Slater (2015).

Finally, we provide an assignment that should be used to build your synthesis in pieces that are eventually 'stapled' together, providing a complete document. This assignment includes a guide that is designed for a peer review with a fellow student so that feedback can be systematic and frequent (weekly). See **Appendices C and D**. To highlight all features and resources, as well as reflect on the iterative nature of this writing guide, we have displayed the complete paper with all major APA components in **Appendix E**; we cross map each chapter and assignment with the final synthesis.

Databases and Key Terms/Words

The topics we consider in this chapter includes *databases* and key words used in the search. First, appropriate *data bases* need to be used in conducting the search. And these databases vary in the journals and media that they contain in their repositories. Second, *key words* need to be used judiciously to find the right content for your topic. These key words are critical in locating relevant content and sufficiently representing warranted literature (peer reviewed journals as well as landmark publications from authoritative authors). In the end, this combination of data bases and key words provides the backdrop for writing with authority.

Data Bases. Although we address specific data bases and provide you an initial set of those relevant to education, your area of interest may be interdisciplinary and span other relevant data bases that focus on political science, history, science, sociology etc. Given that the University of Oregon library has 528 databases, many more specialized databases can be used to access specific disciplinary content. Also note that they vary in the number of returns with key word searches: Some databases return hundreds and thousands of sources for a key word while others return far fewer. This difference is a result of the journals and primary sources that are contained in their repository. The sample data bases listed below are present at the University of Oregon (UO), so if you are working from a different university, check to determine if your local university enlists the relevant data bases.

Academic Search Premier – Multi-disciplinary database providing indexing, abstracts, and selected full text for peer reviewed/scholarly articles, magazines, trade publications, and newspapers in all fields.

Dissertations & Theses @ University of Oregon – Database of dissertations completed at the University of Oregon. Dissertations completed after 1996 are available in full text to current UO faculty, staff and students and on-campus users.
Education Abstracts – Indexes and abstracts of English language journals on education topics.
Education Database – Covers the literature on primary, secondary and higher education as well as special education, home schooling and adult education.
Educator's Reference Complete – Collection of scholarly journals and reports, covering all educational specialties and all levels of education. Provides full text for many of the journals indexed in the ERIC database.
ERIC – Database of journal and non-journal literature covering all areas in the field of education.
Journal Citation Reports – Ranks journals according to their citation influence, covering science, technology, and social sciences. Alternative Name(s) & Keywords: InCites Journal citation reports.
JSTOR – Online archive of peer reviewed/scholarly journals in all disciplines.
Oxford English Dictionary – Traces the usage of words through 2.5 million quotations from a wide range of international English language sources.
ProQuest dissertations & theses A & I. – Provides citations to dissertations in all areas from 1861 to the present. Access is full text access to UO materials only. The availability of UO dissertations and theses are also subject to the author's permission. Previous title is Dissertation Abstracts (Proquest).
Psychology & Behavioral Sciences Collection – Covers topics such as emotional and behavioral characteristics, psychiatry & psychology, mental processes, anthropology, and observational and experimental methods.
Scholars' Bank – An open access repository for the intellectual work of faculty, students, and staff at the University of Oregon. Scholars' Bank includes open access journals, student projects, theses, dissertations, pre- and post-print articles, instructional resources, and university archival material.
Scholars' Bank. Graduate Theses and Dissertations – Electronic theses and dissertations completed at the University of Oregon from 2008 to present. Selected older dissertations may be available. Alternative Name(s) & Keywords: Scholars' Bank (UO Dissertations).
Statistical Abstract of the US – Comprehensive collection of statistics on the social, political, and economic conditions of the United States.
WorldCat – Provides access to library catalogs from around the world. The database contains millions of bibliographic records describing books, journals, maps, musical scores, recordings, videos, manuscripts, etc.
WorldCat.org (free) – Bibliographic records describing books, journals, maps, musical scores, recordings, videos, manuscripts, etc. from libraries around the world.

Two other databases that are oriented to psychology and include the following:
APA PsychInfo® – This software costs after a 30-day free trial of psychology-oriented references.
(https://go.apa.org/psycinfo/?utm_campaign=apa_publishing&utm_medium=cpc&utm_source=google&utm_content=google_searchads_library_psycinfo_05132020&utm_term=%7Bkeyword%7D&gclid=EAIaIQobChMI1Mvw1qOW9QIVeT2tBh1ujACQEAAYASAAEgKlL_D_BwE)

Psychological abstracts (https://psycnet.apa.org/record/2004-16194-004) – They state on the website that it "is the most important single index to research in psychology".

Cooper (1998) also provides several different sources for finding research relevant to your topic, referring to them as *formal* and *informal* channels. "The four major formal channels are professional conference paper presentations, personal journal libraries, electronic journals, and research report reference lists" (p. 51). In contrast, two informal channels include personal contact and personal solicitation (a more modern term would be using a list-serve to solicit responses from group members). Finally, he lists three secondary channels, including (a) research bibliographies, (b) government documents, and (c) two citation indexes:

- Web of Science: Science Citation Index Expanded (https://clarivate.com/webofsciencegroup/solutions/webofscience-scie/)
- Web of Science: Arts & Humanities Citation Index (https://clarivate.com/webofsciencegroup/solutions/webofscience-arts-and-humanities-citation-index/).

Notice that *Journal Citation Reports* in the initial list is a data base of journals and is important in your next step of selecting publications that provide appropriate authority to your literature search. The information that is displayed for any journal includes impact factor (and its trend over time), journal citation indicator, total citations and their distribution, as well as a host of other metrics reflecting the status of each journal. We address several of these issues in the next section on types and outlets. Once a journal is located as an outlet, it also is useful to search its webpage to review other information on the journal such as its distribution cycle, the lead editor, members of the editorial review board, etc. This information, in turn, can be used to locate other authors conducting research on your topic. Finally, the *Cabell* database of journals also is a valuable resource to find appropriate journals (Note: It is similar *Journal Citation Reports*).

Key Terms and Words. All these data bases and publication types/outlets can be tapped using key words in the search. And certainly, these search methods are not exclusive, but can be combined in an interactive manner to quickly identify important resources for your synthesis. For example, you could use review articles to identify alternate words, authors, and outlets; start broad (use a general first key word) and continue to narrow (with qualifications). Begin with the most current research but do not ignore confirmatory (and supplemental research that may be less credible). Include both empirical and theoretical publications as well as find landmark or seminal publications (and use the reference section to trace back publications upon which they were based) (see Galvan & Galvan, 2017, Chapter 3).

Barnet, Bedau, and O'Hara (2020) also suggest the following tips in the search process: (a) use specific terms and phrases in quotes, (b) use advance search strategies to limit the results, (c) consider different government and organization repositories, (d) if an internet resource is being used, parse the url (.gov, .edu, .org) to access the professional organization, and (e) keep your audience in mind and anticipate your argument. In the end, your search should provide a sprinkling of resources that are building in their logic and framing your argument (covered in Chapter 4) and the structure of your paper (see Chapter 5).

As we display in the sample search below and in Appendix E, several qualifiers can be used to limit the search, including the key word/term itself (with synonyms or qualifiers) in various fields such as all text, titles, author, institution, sponsoring agency, subject descriptors, abstract, journal titles, etc. And these fields also can be combined in addition to using combined key words/terms. In using advanced searches that combine key fields and words/terms, tap the potential of using '*and/or'* to combine words/terms. But note the significant difference in this choice. Use of 'and' results in resources occurring in both terms (e.g., elementary *and* "special education") while the use of 'or' results in resources occurring in either or both sets (elementary and "special education"). In this combination of both words/terms placed in the title field, the former (and) resulted in 133 references in a search of ERIC while the latter (or) resulted in 32,721 references. Notice also that this search used quotes to ensure "special education" was considered as one term not two independent words.

In thinking of relevant words/terms, Provost (1972) suggests using a thesaurus to find synonyms, which may expand or constrict your results. At some point in your synthesis, it is likely that relations among variables need to be considered, in which case "you may wish to consider one or more of the following as the term or terms expressing relationship in your research question: affect, affinity, analogous, ancillary, approximate, associate, cause, compare, compatible, concomitant, connect, consecutive, consistent, continuous, correspond, counterpart, depend, different, divergent, effect, embed, equal, equivalent, greater, homogeneity, homologous, identical, independent, indicate, influence, less, like, link, near, opposite, parallel, pattern, peripheral, proportional, reciprocate, reflect, regular, relate, similar, subordinate, superordinate, symmetrical, tension, and unlike." (Madsen, 1992, p. 41).

An important qualifier in any search is that whatever the specific terms used, the result should be a high-quality reference. And it is likely that you traverse a range of sources, from contemporary to historical, from central to peripheral, and from high end research sources to more practical application sources. The goal is to collect "more facts as needed and remain adaptable, flexible, and open-minded all the while. Be prepared to take different perspectives seriously and be on the lookout for areas of ambiguity, unsettle issues, and debatable questions" (Barnet et al., 2020 p, 255). One note from this source: "In sum, the internet gives us unprecedented access to information and to our own assertions of authority, but this empowerment also requires us to examine information carefully and proffer it responsibility. It is important to respect accuracy and reliability when sharing our ideas on the internet, to track the sources of viral stories, and to fact-check as much as possible the claims and details they offer" (Barnet, Bedau, & O'Hara, 2020, p. 272). This reference also covers 'fake news' but, because of our focus is on research writing, this topic is only relevant if internet resources are being used to set the context (e.g., in an opening paragraph or an introductory paragraph of a major section) or provide peripheral information on the side of an argument.

The remaining section of this chapter provides a sample search process (particular to the University of Oregon Libraries) but given the similarities across institutions of higher education (IHEs), this process is quite universal. This section also includes the use of citation management tools, with three considered. Finally, the chapter ends with three appendices (B, C, and D) that are used throughout the rest of the book: writing planning with Write Right Now (considering

critical words [concepts and vocabulary] to use in planning your search), an assignment, and a review guide for this assignment.

Sample Search Process

This section is a condensed version of the services provided by the University of Oregon library, and logistical information about accessing services, including library resources, search strategies, and citations management tools. Additionally, we share workshop information and show you how to schedule individual appointments if you need further assistance. UO Library website has plenty of video tutorials and how-to guides that were created to make your search journey easier.

1. **Library Resources**
2. **Search Strategies**
3. **Citations Management tools**
4. **Workshop Information**
5. **Individual Appointments**

1. Library Resources – Ultimate One Stop Shop. Go to the home page called Library search, and this is what we would call our library catalog. In the library catalog, you can find books, e-books, DVDs, and streaming videos. It also searches for a selection of articles as well. And it is our consortium of libraries in the Pacific Northwest, so that is how we can get you books from Oregon State or the University of Washington for example. Then, the articles feature searches across many different databases to return both peer-reviewed articles, as well as newspaper articles. Note that these steps are also addressed by Galvan and Galvan (2017) in Chapter 2.

2. Search Strategies. Many open access journals are being searched as well. Open access journals are free journals where the institution is not paying for a subscription. Sometimes, your search can bring up over 1,000 results just to make you aware that they are available for you, but surely, you need to further narrow your search by adding more filters such as dates or keywords.

General Databases. The UO library has hundreds of different databases. A database is a combination of many publications organized around one subject area. Two types of databases exist: subject-specific databases and format-specific databases. Most of these databases also have filters that allow you to organize the results more precisely. If you only wanted articles that were literature reviews or used a qualitative research method, you can filter the search by methodology. Two ways to get started include using the (a) A-to-Z list or (b) search guides. You could go back and forth between both to narrow the broad source of all the publications.

Subject-Specific Databases. Many specific databases exist for various disciplines, such as education and health sciences, for arts and architecture. Such databases allow you to get more focused results than using a more open-ended or exploratory search. If I was looking for articles that are related specifically to the field of education, I might want to start in a database related to that, this way, I am only getting articles that are at least broadly related to the topic (e.g., ERIC - one of the main databases for the discipline of education).

Format-Specific Databases. These databases are organized by format, for example, newspaper databases and others like streaming video databases. It is likely that these databases are peripheral for your central research question but may be helpful in establishing a context.

Trouble Accessing Full Text Materials. On occasion, you may come across an article in Google Scholar and are asked to pay a fee to access full text. Well, you should not have to do that, because, as a UO student, you can access it from the library loan. Typically, UO libraries make full-text access to eBooks and journal articles easy. However, some articles only show an abstract. In that case, try to access full text using the internet library loan service or try finding the article on Google Scholar. Note, however, that it may take a few days to gain access, so be sure to start your search ahead of time.

The University of Oregon has two different ways to get books from other universities.

1. Requests from Pacific Northwest– up to 10 days.
2. Request from the East coast – home delivery for books available.

Keywords: Define Concepts Focused on a Research Question. For example, the main topic poses the following question: How does school start time affect the academic success of high school students? Key terms would be *school start time, academic success* in *high school student*s. Once you have those kinds of key concepts you can brainstorm additional keywords.

If you are getting too many results	If you are not getting enough results
• Try adding parentheses	• Avoid being overly restrictive/precise • Try playing around with synonyms

Appendix A – Words are not Just Words: The Professor and the Madman

Appendix B – Log in, Google Entities, Write Right Now: Prompt, Concepts/Vocabulary, Response

Appendix C – Assignment 1

Appendix D – Assignment Review 1 Guide

Appendix E – Developmental Construction

Book References

Barnet, S., Bedau, H., & O'Hara, J. (2020). *From Critical Thinking to Argument: A Portable Guide*. New York: Bedford/St. Martin's.

Cooper, H. (1998). *Synthesizing research: A guide for literature reviews* (4th ed.). Thousand Oaks: Sage.

Elbow, P. (1973). Freewriting. In *Writing without teachers* (pp. 1-7). New York: Oxford, UP.

Galvan, J. C., & Galvan, M. C. (2017). *Writing literature reviews: A guide for students of the social and behavioral sciences*. New York: Routledge.

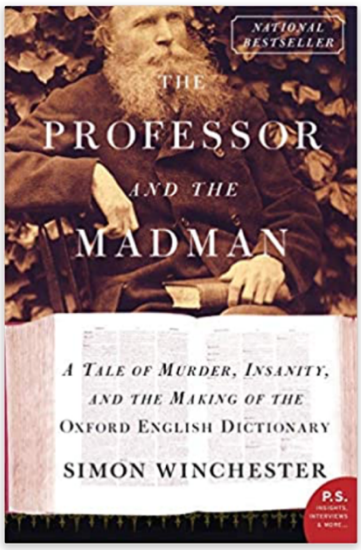
Madsen, D. (1992). *Successful dissertations and theses: A guide to graduate student research for proposal to completion*. San Francisco: Josey-Bass.

Provost, G. (1972). *100 ways to improve your writing*. New York: Penguin.

Tindal, G., Irvin, P. S., Nese, J. F. T., & Slater, S. (2015). Skills for children entering kindergarten. *Educational Assessment, 20*, 297–319.

Tindal, G., Nese, J. F. T., & Stevens, J. (2017). Estimating school effects with a state testing program using transition matrices. *Educational Assessment, 22*(3), 189-204.

Appendix A – Words are not Just Words: The Professor and the Madman



In the mid 19th century, Professor James Murray was developing the first edition of the Oxford English Dictionary (OED). His system for compiling words involved volunteers from around the world sending him cards with information on each word in print, where it first occurred, and how it was defined. Lo and behold, he noticed one of his sources was not just productive but prolific. So, he decided to find out where this person was located. It turns out that Dr. William Minor, who had submitted over 10,000 words was a patient at the Broadmoor Criminal Lunatic Asylum. Both a book and a film have been published depicting this story as it unfolded in *The Professor and the Madman: A Tale of murder, insanity, and the making of the Oxford English Dictionary* (Simon Winchester, 1998, New York: Harper Collins Publisher). OED is considered the most authoritative dictionary of words, tracing their origin and nuances of meaning.

WRN is all about words, with teachers giving privilege to those they want students to learn and use in their writing. Not all words are equal, however, and not all words have deep carrying capacity for meaning. Words can be splashed like color, arranged in a sequence like music, and varied with intonations in speech.

At the base of WRN are **concepts**, which are words that are abstract and provide a general notion that needs to be filled in with **vocabulary** words in defining them. Concepts are buckets that are broad and nuanced. Some examples of concepts include freedom, foundation, premise, personality, (main) idea, setting, era, proclivity, habitat, rhythm, and on and on and on…

In WRN, teachers select materials for students to read that can range from literary works to biographies, poems, fiction, non-fiction, newspaper articles, and on and on and on…These materials are used to identify concepts with vocabulary words poured into them. Usually, 2-5 concepts are sufficient, and 5-10 vocabulary words can be identified for each concept. This system is activated so that, when students write responses to a prompt, these words are identified and highlighted. By focusing on **words**, two benefits are provided. First, teachers can focus students on varying levels of specificity by guiding their writing. And most importantly, teachers can provide immediate feedback to students without having to score and evaluate their writing other than scanning responses to ensure sensibilities.

This system is particularly applicable for English language arts with biographies and autobiographies. In such texts, three typical concepts include personal characteristics, time/era, and remarkable events. Biographies and autobiographies are always about a person or significant people who come to life in the descriptions of them, the time/place where they lived, and in the outcomes or events that made them worthy of being published. Narratives also have a steady conceptual basis that may include characters (protagonists and antagonists), settings, plot, problems, solutions, climax, and suspense.

Moral of this blog: Be selective and inclusive in targeting important words (concepts and vocabulary) that help structure the text for meaning/interpretation and are used to score student responses.

Appendix B – Write Right Now Guide

Guide

Sign Up-Sign in to Write Right Now (https://writerightnow.com): Log in as a *student* and connect to a teacher with PROWRITE)

Example Google Entities

Persons	Events
In 1853, Margaret Douglas was sentenced to 1 month in jail for her attempts to teach the children of freed slaves to read and write (Blaustein & Zarigrando, 1968). In 1896, Plessy V. Eerguson legitimated the doctrine oi separate but equal, even though segregated education in the Jim Crow period was by no means equal (Jackson & Weidman, 2006). In the late 19th century and early 20th century, attacks on Black communities during race riots included the burning of Black schools (Harmer, 2001). Early 20th century mental testing was grounded in the premise of American eugenics that races other than those of northern European stock were intellect: ually inferior, and that the purity of the superior races should be preserved by vigorously segregating the "feeble-minded" (Terman, 1916).	In 1853, Margaret Douglas was sentenced to 1 month in jail for her attempts to teach the children of freed slaves to read and write (Blaustein & Zarigrando, 1968). In 1896, Plessy V. Eerguson legitimated the doctrine oi separate but equal, even though segregated education in the Jim Crow period was by no means equal (Jackson & Weidman, 2006). In the late 19th century and early 20th century, attacks on Black communities during race riots included the burning of Black schools (Harmer, 2001). Early 20th century mental testing was grounded in the premise of American eugenics that races other than those of northern European stock were intellect: ually inferior, and that the purity of the superior races should be preserved by vigorously segregating the "feeble-minded" (Terman, 1916).
Locations	**Groups**
In the wake of Brown v. Board of Education (1954) and legislative action to provide equal access to education, institutional structures, such as ability grouping and significantly separate special education classrooms, continued to keep minority students segregated from their White peers (Losen & Welner, 2001).	The initial identification of the problem of disproportionate representatioh of some groups, most notably African American students, in special education is often traced back to Dunn's (1968) classic critique of the field.

Write Right Now Prompt, Concepts/Vocabulary, and Response

Prompt

List the databases and search terms that you plan to use (people, location, dates, events). Refer to the issues/variables you plan to consider in your search. Consider delimiters: (a) descriptors by population characteristics such as ages, grades, demographics, etc., (b) settings such as schools, hospitals, treatment centers, communities, etc., (c) interventions and interventionists, and (d) outcomes (length of study, definition of effects and measurement of results, etc.)
Use any/some of the following concepts (underlined phrase below) and the vocabulary words within them.

Concepts/Vocabulary

Databases: Academic Search Premier, Education Abstracts, Education Database, Educator's Reference Complete, ERIC, Journal Citation Reports, JSTOR, Oxford English Dictionary, ProQuest dissertations & theses A & I, Psychology & Behavioral Sciences Collection, Scholars' Bank Theses and Dissertations, Google Scholar	Search terms: academic, ages, accountability, author, behavior, boys, children, communities, curriculum, dates, demographics, disability, education, effectiveness, empirical, events, females, gender, girls, geographic terms, grades, interventions, journal, language, learners, legal, legislation, location, males, measures, names, observation, outcomes, parents, participants, people, populations, relations, reliability, results, samples, schools, settings, social, students, subject areas, subject terms, subjects, survey, teachers, tests, title, treatments, validity, years

Response

The main databases used include Academic Search Premier, ERIC, and Google Scholar

The primary search terms include students with disabilities, academic skills measurement of students, large-scale tests, statewide accountability systems

If these terms are too broad, I may qualify my terms using students with significant cognitive disabilities, state tests

Legislation references No Child Left Behind (NCLB) and Every Student Succeeds Act (ESSA)

Dates range from 2002 to 2015

I am only interested in school age students, so I may add Grades 3-8

I also may include the word NOT: interventions, learning disabilities

Appendix C – Assignment 1

Summarize the data bases, search terms, delimiters, and outcomes used in framing your literature synthesis.

From Academic Premier vs. ERIC
In this study, the following search terms were used with Academic Search Premier
Students with disabilities (17,160) vs. 21,768 in ERIC
Students with cognitive disabilities (282) vs. 460 in ERIC
Students with disabilities and measurement (650) vs. 597 in ERIC
Students with disabilities and measurement and accountability (96) vs. 68 in ERIC
Add Tindal (Author) to Students with disabilities and measurement and accountability (3) vs. 3 in ERIC (with technical reports and NCAASE documents).
The following limitations were not invoked: full text, articles with references, or scholarly (peer reviewed) journals

I used two primary databases: Academic Premier and ERIC. Using common terms only addressing '*students with disabilities'* resulted in far too many (thousands of) references to be useful. I therefore systematically limited this basic term (which also includes ALL disability types), I focused only on students with '*cognitive disabilities'*, which still resulted several hundred references. Because I was primarily interested in measurement, added this term, again with fewer references but too many (hundreds). Given that this dissertation/thesis is about state accountability systems, I added '*accountability'*, resulting in sufficient references for use in the literature synthesis. The results of this research include (a) performance outcomes, (b) teacher practices, and (c) recommendations for including students with cognitive disabilities in a statewide testing program.

Note: For this example, when I added '*Tindal'* as an author of this literature, I found three references that are used in this example assignment: Anderson, Lai, Alonzo, and Tindal (2011), Crawford and Tindal (2006), Ketterlin-Geller, Alonzo, Braun-Monegan, and Tindal (2007)

Here is an example of *Cite While You Write* (which must be downloaded)
• Preferences **Application**: Endnote and Endnote Online
• Preferences **Keyboard**: Control 1, 2, 3 used to toggle to/from endnote-word, insert a reference, and modify its format, respectively.

Assignment References

Anderson, D., Lai, C.-F., Alonzo, J., & Tindal, G. (2011). Examining a grade-level math CBM designed for persistently low-performing students. *Educational Assessment, 16*(1), 15-34. doi:10.1080/10627197.2011.551084

Crawford, L., & Tindal, G. (2006). Policy and practice: knowledge and beliefs of education professionals related to the inclusion of students with disabilities in a state assessment. *Remedial & Special Education, 27*(4), 208-217. doi:10.1177/07419325060270040201

Ketterlin-Geller, L. R., Alonzo, J., Braun-Monegan, J., & Tindal, G. (2007). Recommendations for accommodations. *Remedial & Special Education, 28*(4), 194-206. doi:10.1177/07419325070280040101

Appendix D – Assignment 1 Review Guide

Note 1: The review bullets listed below are presented only to be suggestive and not definitive so the assignment does not need to include all of them, and the review should not detract if they are not present.

Note 2: When Assign1 is combined with Assign2, the result should be (a) a tentative statement of the problem and (b) a cogent literature search (with results). Both should eventually be used in the first page or two of the paper as the paper is fully developed.

Review the **Databases**
- Was more than one database used?
- Were any subject-specific data bases used?
- Were these databases used: ERIC, World Premier, or Google Scholar?

Review the **Search Terms** (and **Delimiters**)
- Did the search terms include general keywords, followed by delimiters and qualifiers?
- Were topics narrowed or broadened systematically?
- Were the key words coherently related?
- Was Boolean Logic used (and limits / or expands)?
- Did the search use wildcard (*) or 'not'?
- Did the search use Auth, Title, Keywords, Journal?

Review the **Outcomes**
- Are at least a few of these references recent?
- Were review articles or landmark or classic studies included?
- Does the search result in current publications?
- Do the outcomes reflect a range of publications (peer-reviewed journals, review papers, etc.)
- Do the outcomes reflect reliability, validity, and trustworthiness of the sources?
- Are references listed in APA format?
- Is the summary of the search cogent and reflective of the problem?

Helpful Next Steps
- What suggestions would be helpful to move in integrating the references?
- What important variables might be considered in moving to Assign3 (given these references)?

Appendix E – Developmental Construction

Title Page with Author and Affiliation – From Assign 9

Abstract – From Assign 9

Introduction (Level 1)

Opening Paragraph of Essential Argument – From Assign 4

Summary of Literature Search Process – From Assign 1 and Assign 2

Paragraph(s) describing body of paper with levels of headings, structure, and transitions – From Assign 3 and Assign 5

Big Idea 1 from Literature (Level 2)

Paragraphs reflecting structure and transitions – From Assign 1, Assign 3, and Assign 5

Expansion 1 of big idea 1 (level 3). Paragraphs reflecting structure and transitions – From Assign 1, Assign 3, and Assign 5

Expansion 2 of big idea 2 (level 3). Paragraphs reflecting structure and transitions – From Assign 1, Assign 3, and Assign 5

Big Idea 2 from Literature (Level 2)

Paragraphs reflecting structure and transitions – From Assign 1, Assign 3, and Assign 5

Expansion 1 of big idea 2 (level 3). Paragraphs reflecting structure and transitions – From Assign 1, Assign 3, and Assign 5

Expansion 2 of big idea 2 (level 3). Paragraphs reflecting structure and transitions – From Assign 1, Assign 3, and Assign 5

Conclusion (Level 2) – From Assign 6

Method – From Assign 7

Opening paragraph describing topics at Level 1…

Setting (Level 1)

Participants (Level 1)

Data Collection Procedures (Level 1)

Technical Adequacy of Measures (Level 1)

Etc. Etc. Etc.

Discussion – From Assign 8

References – From Assign 1, Assign 3, Assign 5

Appendix (Optional) – From Assign 3

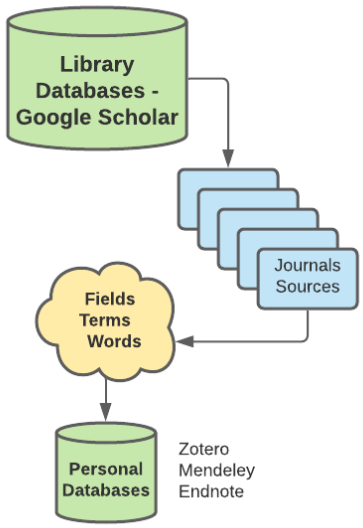
Chapter 2

Harvesting Authoritative References: Journals and Researchers

BRT

behavioral research & teaching

This chapter addresses *publication types and outlets,* as well as *impact factor* and *h-index* for researchers. The publications themselves must be authoritative and comprehensive outlets of theory and empirical findings. The impact factor and h-index simply provide evidence of authority. However, as you harvest references, the first criterion is the need to represent something of particular interest to you. The primary reason for this is that you must live with it for the next year or two. A second criterion is that you are likely to know something about topics in which you have an interest, at least in a vague way. In developing a topic, be sure to consider its '(re)searchability' or the degree to which it can result in a coherent paper of approximately 35 pages within the quarter or semester for this course. Madsen (1992) offers five other criteria to help define a topic of interest that can sustain your interest by being (a) within your range of competence, (b) manageable in scope and size, (c) original with a potential to contribute to the field, (d) a set up for obtaining data (primary or secondary), and (e) a reflection of your personal independence. In anticipation of Chapter 4 that focuses on argumentation, we also add that the eventual question/issue must be capable of being disconfirmed (Popper, 2002). In the end, these references need to be assembled, preferably using a bibliographic software. The chapter ends with a review of three software options, one of which is described in **Appendix E** (Endnote).



Appendix A – Authoritative References in Research: Tracking Command of Voice

Authoritative References Publication Types and Outlets

In this section, we present several different publication *types* and *outlets* that differ in the degree to which they provide authoritative warrants to make claims supported by evidence. "An important part of finding and evaluating the reliability of your sources is determining whether they are scholarly or popular sources" (Barnet, Bedau, & O'Hara, 2020, p. 264). The following references are listed in order of authority. As you harvest these resources, both authoritative publications and researchers, consider using a bibliographic software that we described in Chapter 1.

- *Research reviews* (e.g., *Educational Research Review*) provide a synthesis of research in an area with a qualitative summary of both findings (consistencies and inconsistencies), as well as the studies themselves. An online example of reviews is *Education Thinking (*https://www.analytrics.org) that "publishes stand-alone literature reviews in all areas of educational research. Education Thinking is unique in that it is the only global scholarly peer-reviewed English-speaking educational research journal entirely dedicated to literature reviews, welcoming all approaches to literature reviewing" with more information on the journal site available at https://www.analytrics.org
- *Meta-analyses* use effect sizes to quantify the results of studies and analyze various components of the studies themselves (e.g., sample, duration, instrumentation, etc.).
- *Empirical, peer-reviewed journals* provide either quantitative or qualitative outcomes, in which a specific treatment or type of observation is deployed under controlled conditions, either with a

control [comparison] condition or as a quasi-experimental design with extant groups (and statistical controls provided after the fact like regression discontinuity or propensity designs).

- *Special issues* summarize current research in an area, usually specific to a journal, but often address a contemporary range of issues (e.g., identification, treatment, populations, etc.).
- *Conference proceedings* often present early findings and, depending upon the organization, can be broadly framed (e.g., *American Educational Research Association, National Council on Measurement in Education*) or specifically narrow (e.g., special interest groups [SIGs] or list servs).
- *Electronic and open-source journals* are like peer-reviewed publications and may even be peer reviewed. Note that online publications need to be carefully evaluated in terms of the organization behind the publication (and the domain or url such as .gov or .edu), as well as reference to being published elsewhere.
- *Handbook chapters* are often associated with disciplines and professional organizations (e.g., science, mathematics, English language arts, etc.) and provide comprehensive coverage of topics, both over time and (sub)topics within a discipline.
- *Government publications* provide information on policies (at both federal and state levels), findings (e.g., *What Works Clearinghouse*), or data (e.g., demographics with extensive tables).
- *Technical reports* from institutions, are often commissioned by agencies or reflect research centers at IHEs (e.g., *Institute for Research on Learning Disabilities* [IRLD] at the University of Minnesota that was funded in the mid-1970s to mid 1980s, *Regional Educational Labs* [RELs], that are funded every five years by the federal government, *Behavioral Research and Teaching* [BRT] at the University of Oregon that focuses on curriculum-based measurement and various dimensions of measurement and decision making).
- *Legal documents* present coverage on specific rulings (e.g., *Riley v Board of Education* on racial disparities) or national legislation (e.g., *No Child Left Behind* or *Every Student Succeeds Act*).
- *Memoranda* from legislative bodies (e.g., at state or federal levels).
- *Professional organization publications* (e.g., *Council of Chief State School Officers* [CCSSO] and *State Collaboratives on Assessment and Student Standards* [SCASS] or content-specific groups (*National Writing Project* – [NWP]), all of which present current information for a specific group.
- *White papers* are written to summarize innovative issues (e.g., *NAEP Validity Studies* publications) or time-stamped perspectives.
- *Dissertations and theses* (e.g., *Dissertation Abstracts International* [DAI] and *Dissertation Abstracts Online* [DAO]) are often well-done research publications that satisfy a committee as qualification for a PhD or DEd degree, but also reflect an initial publication from a candidate.
- *Book chapters* present invited content on a theme (e.g., type of treatment, measurement, or population etc.). Note these are different than handbook chapters in not being necessarily discipline oriented with authoritative authors.

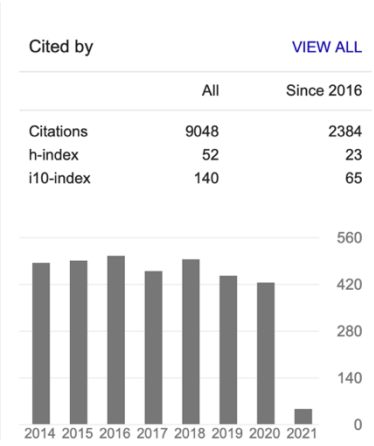
- *Books*, sometimes edited, are usually organized around a market (e.g., courses for institutions of higher education – IHEs) with a publisher offering experienced researchers a platform to organize content and perspectives on that content.
- *Abstracts, encyclopedias, and reviews* within journals are useful for identifying authors or subtopics but are not to be used as a reference.
- *Newsletters* (e.g., *National Center on Educational Outcomes* [NCEO]) are useful for identifying topics of relevance for practitioners but are rarely sufficiently authoritative as a reference.
- *Internet materials (blogs, posts, products, etc.)* are like newsletters but are only useful in identifying topics and trends. Note that key word searches on the internet can result in hundreds of references.

This list is certainly not exhaustive but covers the general scope of publication types and outlets. In conducting a search using either library databases or Google Scholar, three caveats should kept in mind: (a) many scientific and empirical studies are biased toward only publishing significant results, (b) a literature synthesis should include a range of publications types and outlets to frame an argument, and (c) the applicability of the type and outlet can vary from setting context, providing peripheral perspectives, defining terms and practices, or presenting data (quantitative or qualitative).

Two Final Considerations

The following two considerations should be part of your review that can influence the credibility of your main argument. *Impact Factor* relates to the quality of the publication while *h index* relates to the credibility of the researcher(s). This latter index is from Google Scholar, which assumes the researcher has chosen to list their name in this repository.

Impact Factor. This index is about a measure of journal influence. For other similar metrics, see Citation impact. The **impact factor** (**IF**) or **journal impact factor** (**JIF**) of an academic journal is a scientometric index calculated by Clarivate that reflects the yearly average number of citations of articles published in the last two years in each journal. It is frequently used as a proxy for the relative importance of a journal within its field; journals with higher impact factor values are often deemed to be more important, or carry more intrinsic prestige in their respective fields, than those with lower values.



h Index for Researchers. Once appropriate journals have been located, review the relevance of articles for your topic and consider the author's h-index: The **h-index**: number of publications **and** the number of citations per publication. The !10-**index:** the number of articles with at least **10** citations. Look for a high h-index and !10-index. An example is presented here.

In summary, "to find good sources, you must have a strategy for searching. What strategy you use will depend on your topic" (Barnet, Bedau, & O'Hara, 2020, p. 253). In the result, your resources need to be credible, persuasive to your audience, as current as possible (though perhaps also tracing important historical or seminal publications), capable of corroboration, and essential or extensive to your main

argument. Unfortunately, the most recent transition in the publishing industry is an online outlet, making it easy to access but difficult to judge (in terms of these criteria).

Citations Management Tools

The three main citations tools promoted by the University of Oregon (UO) library are Zotero, Mendeley, and EndNote. The former two are free for UO students. These three tools are helpful to keep your citations in order and always handy for extracting the citations when needed. They also allow you to organize your research into folders, such as using tags. Some people like to organize their citations by subject area, others like to organize specific classes or projects they are working on. Lastly, the three citations mentioned also allow you to generate a reference list and in-text citations.

One major difference between the tools is collaboration ability. If you want to collaborate with a group, Zotero is better because it allows more groups where you can share your citations and files with people. On the other hand, Mendeley has limits on how many private groups you can have, as well as how many people can be in them. Whichever you prefer to use as the citation tool is entirely up to you, but using one is better than using nothing at all. The following table presents some of the differences between them.

Table 1

A Comparison of Three Citation Management Tools

Zotero	Mendeley	Endnote
Free	Free	Free for 30 days OR $115.95
PDF storage	PDF storage	-
Can organize by topic	Can organize by topic	Can organize by topic
plug-ins for Microsoft word	plug-ins for Microsoft word	plug-ins for Microsoft word
Can create folders	Can create folders	Can create folders
plug-ins for Google docs.	plug-ins for Google docs.	-
web-based access	web-based access	-
-	-	Keyboard shortcuts
Desktop version available	Desktop version available	Desktop version available

Note: This table is continued on the next page.

.TXT file	.CSV file	.RIS file
-	annotation feature built into application allowing you to highlight PDFs and add comments on your computer	comes with your subscription to Web of Science (the web-based version of EndNote) It is called Basic because it does not have the same number of features as the desktop version, but it is free to use while you are at UO, you do have to use your UO email to set up an account
More free storage space	Limited storage space	-
Collaboration friendly	Collaboration friendly	-

You can sometimes export results like a CSV File, and then open an Excel file or export them to a citation management tool like **Mendeley**. It could be useful to set up an account to keep track of new references that are added. You also can use an account to save searches that you have completed, as well as create folders within the database to add articles as appropriate. Keep in mind that different databases have different limits on how many citations you can export at once to the citation management software.

Appendix A – Authoritative References in Research: Tracking Command of Voice

Appendix B – Write Right Prompt, Concepts/Vocabulary, and Response

Appendix C – Assignment 2

Appendix D – Assignment 2 Review Guide

Appendix E – Developmental Construction

Book References

Barnet, S., Bedau, H., & O'Hara, J. (2020). *From critical thinking to argument: A portable guide*. New York: Bedford/St. Martin's.

Madsen, D. (1992). *Successful dissertations and theses: A guide to graduate student research for proposal to completion*. San Francisco: Josey-Bass.

Popper, K. (2002). *The logic of scientific discovery*. New York: Routledge: Imprint of the Taylor and Francis Group.

Appendix A – Authoritative References in Research: Tracking Command of Voice

The captain of a navy ship saw a beam of light straight ahead, so s/he signaled for them to "change course by 10 degrees west." The response was "You change course 10 degrees east." The captain then signaled. "No. We are the U.S. Navy, so change course west by 10 degrees." Again, the response was: "You change course 10 degrees east." Finally, the captain signaled: "We are the most authoritative ship at sea and coming straight at you." The final response to the captain was "Fine. We're a light house."

In the science of education, references come in different types and include meta-analyses, dissertations, theses, literature reviews, theoretical journals, peer reviewed journals, research summaries, research reviews, practice journals, books, chapters, handbooks, open source, on-line papers, reports, legal documents, white papers, conferences, presentations, policy documents, memoranda, papers, reviews, articles, journals, documents, syntheses, proceedings, conferences, dissertations, theses, abstracts, newsletters.

References are also published in various outlets including government outlets such as library, databases, internet searches, professional organizations, web sites, newspapers, government documents, publishers, institutional repositories, What Works Clearinghouse.

And so, it is with authority, whether in writing, legal circles, or organizational structures. Authority provides command and in writing, it confers a short cut to warrants, providing a safe landing with references. In scholarly writing, authoritative references are the bed rock of education as a science. In WRN, Google entities provide an immediate feedback loop to persons, locations, events, and dates. The screen shots of the Google Entity reports in this blog reflect direct quotes from an article on over-representation of minority students in special education[1]

Authoritative references to empirical research include the authors, dates, study title, and source (journal or publication). In educational research, such empirical references are best located by clicking on *persons*. Authority is also conferred by reference to specific *events* (often with dates) that can be cross checked in other empirical studies. Finally, *locations* and *groups* target more information, providing credibility to the narrative. Otherwise, vague generalities are poised that are difficult to refute.

Moral of this blog: To create an authoritative approach to research, references are best distributed in their type and outlets across the main warrants used to build an argument leading to conjectures, and eventually with evidence to support claims.

**This image was acquired from Photo by James Walker from FreeImages*

[1] Skiba, R. J., Simmons, A. B., Ritter, S., Gibb, A. C., Rausch, M. K., Cuadrado, J., & Chung, C. (2008). Achieving equity in special education: History, status, and current challenges, *Exceptional Children*, 74(3), 264-288.

Appendix B – WriteRightNow Prompt, Concepts/Vocabulary, and Responses

Prompt

Highlight a few exemplary publication types and their outlets that you plan to use in your literature synthesis. Reflect on their authority, source, recency, directness, etc.

Note: Use any/some of the following concepts (underlined phrase below) and the vocabulary words within them.

Concepts/Vocabulary

Publication Types (What): meta-analyses, dissertations, theses, literature reviews, theoretical journals, peer reviewed journals, research summaries, research reviews, practice journals, books, chapters, handbooks, open source, on-line papers, reports, legal documents, white papers, conferences, presentations, policy documents, memoranda, papers, reviews, articles, journals, documents, syntheses, proceedings, conferences, dissertations, theses, abstracts, newsletters	Publication Outlets (Where): library, databases, internet searches, professional organizations, web sites, newspapers, government documents, publishers, institutional repositories, What Works Clearinghouse

Response

I plan to locate the few references that exist in journals and articles, especially peer reviewed journals in both assessment and measurement as well special education. My first strategy is to use library databases. I also plan to determine if any professional organizations focus on my topic: National Council on Measurement in Education, American Education Research Association, Special Interest Groups, National Council on Educational Outcomes, and a few institutional repositories of technical reports. Conference proceedings may be important given the timeliness of this issue: The National Conference on Student Assessment and the Council of Exceptional Children often have conference presentations on related issues. Finally, I think some timely policy documents might be good to find. I won't find anything in books, chapters, or handbooks.

The primary authority will be in the lack of literature pressed against the strong need for accountability with a population that is tough to assess. This issue is very recent with federal legislation changes from NCLB to ESSA. The problem will be in piecing together a fair amount of literature from professional organizations, conference proceedings, government documents, and website postings.

Appendix C – Assignment 2

Identify your topic (tentative title), describe the problem, locate publication (types and outlets), and summarize a few empirical papers on your topic. See Galvan and Galvan (2017, pp 15-16, Activity 1).

Topic: Use of Transition Matrices in State Accountability Systems

Problem: Students with disabilities, though included, cannot be part of accountability systems that monitor growth because a vertical scale is rarely used.

Publications: The literature on transition matrices includes…

Conference papers

Peer-reviewed journals

Special Education

Assessment

National organizations

Council of Chief State School Officers

National Center in Educational Outcomes

Government publications-databases

Annual Report to Congress

National Center on Educational Statistics

National Assessment of Educational Progress

Summary: In the following two studies by Hill (2006) and Schafer et al. (2012)…

Assignment References

Galvan, J. C., & Galvan, M. C. (2017). *Writing literature reviews: A guide for students of the social and behavioral sciences*. New York: Routledge.

Hill, R. (2006, April). *Using value tables for a school-level accountability system*. Paper presented at the National Council on Measurement in Education (NCME) Annual Conference, San Francisco, CA.

Schafer, W. D., Lissitz, R. W., Zhu, X., Zhang, Y., Hou, X., & Li, Y. (2012). Evaluating teachers and schools using student growth models. *Practical Assessment, Research & Evaluation*, *17*(17), 1–21.

Appendix D – Review of Assignment 2

Identify your topic (tentative title), describe the problem, locate publication (types and outlets), and summarize a few empirical papers on your topic. See Galvan and Galvan (2017, pp. 15-16, Activity 1).

Note: Assignment 1 was completed with a variety of formats from various students. Diversity is to be celebrated. And many of you are taking advantage of previously completed writing (a good thing). An important purpose of a peer review is to learn from each other. When Assign1 is combined with Assign2, the result should be (a) a tentative statement of the problem and (b) a cogent literature search (with results). Both should be used in the first page or two of the paper.

Please use track changes and inserted comments. **When done, add your initials to the end of the file name and send to your partner** sometime before class on Tuesday at 4:30.

Example: If someone reviewed TindalAssign1.docx, I would expect to receive the edited version as TindalAssign1JA.docx (from Julie Alonzo as the reviewer).

Review the **topic** and **problem** in terms of specificity and clarity

- Is it specific enough to be done as a thesis or dissertation? If not, how could the problem/issue be narrowed?
- What critical terms are important to consider in defining the problem/topic?
- What related topics/issues are implied that need to be (a) ignored or (b) considered?
- What suggestions can be made to improve the topic/problem?

Review the **publications** (references)

- Do they reflect the problem/issue?
- Are empirical references used from high quality journals (are authoritative)?
- Are other (non-empirical references) deployed to properly contextualize the problem/issue?
- Are the references properly formatted?
- What suggestions can be made to improve the publications?

Summary

- Is the summary a succinct description of the problem/issue?
- Can the summary be used to launch a more comprehensive search?
- What suggestions can be made to improve the summary?

Helpful **Next Steps**

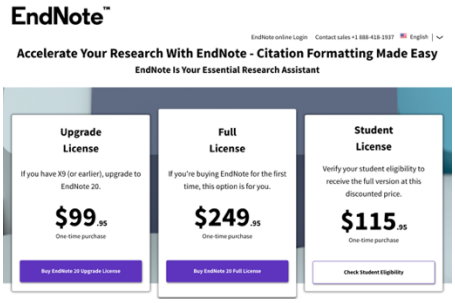
- What suggestions would be helpful to move toward a database search?
- What important terms could be used to focus/delimit the search?

Appendix E – How to Use EndNote and UO Libraries

Developed by Yana Markedonova

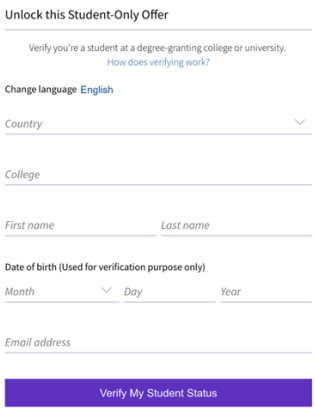
Endnote 20 is comprehensive and now connected to the internet into the library with databases and publications. If you use Endnote, you can either get it for free for 30 days and finish most of your citation work for the entire course, or you can buy it for $115.95. While it is more expensive than Mendeley and Zotero, it is extremely helpful if you prefer writing and citing along the way, as it is fully integrated with Microsoft word. See **Appendix E** for a detailed breakdown and guides to searching for articles/ citing them using Endnote.

1. To install endnote as a student, use the student discount available for anyone who can verify their student status.

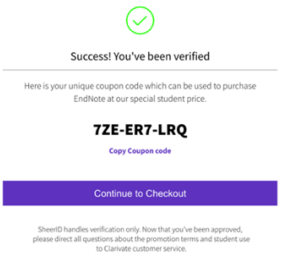


2. Select the Student License

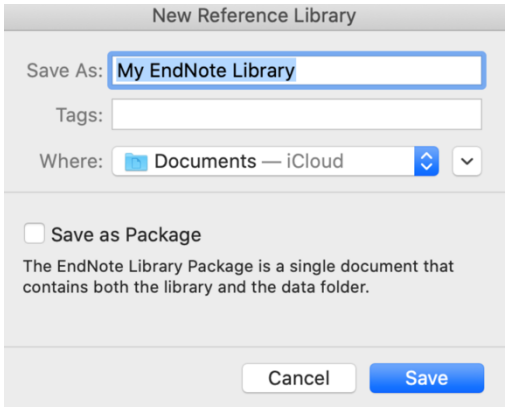
3. Unlock student offer



4. Use coupon code to receive a student discount



5. Next, depending on the computer you have, visit https://endnote.com/downloads to select and download.
6. Once you have downloaded it (for iOS drag the application to the Finder folder)
7. The next part was tricky - the app EndNote app will NOT open if you try by double-clicking like other apps.
8. Instead, click on EndNote, find "File" on the top left corner of the desktop, select "New" and 'Save"



9. Viola! You are all set on installing EndNote!

Implementing EndNote to your daily Life

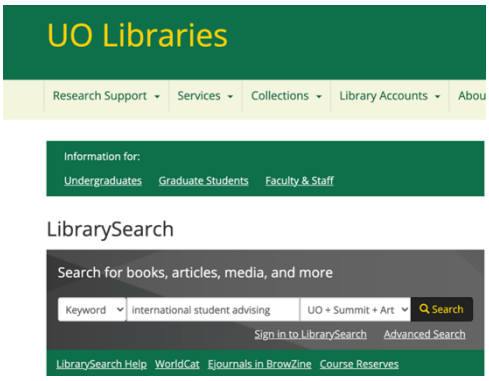
- When saving a new reference, always choose save as ". ENLP"
- Keep in mind that EndNote works accurately for books and journals, and needs more revision for other types of research (Webpages, magazines, etc.)

How to Use UO Libraries

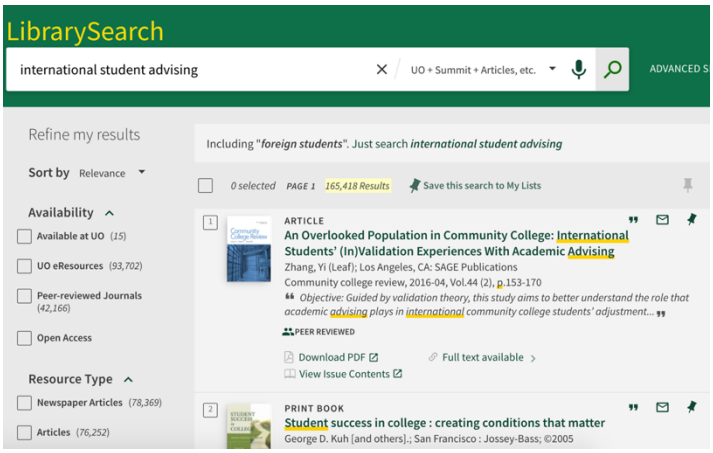
- One of the best resources for you will be https://library.uoregon.edu/
- It contains a comprehensive database of research articles and peer reviewed journals.
- Here is a tutorial that perfectly explains she by step locating peer reviewed articles: https://uoregon.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=aeb801f4-beb6-4395-a47c-ac15003beb59

UO library Home Page

Let us walk through this together. Sign in to your UO account. Using search bar, I looked for *international student advising*

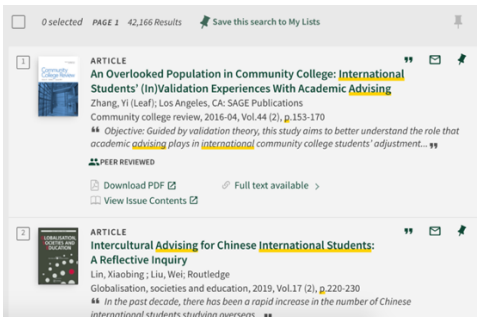


That yielded *165,418* Results. From there on, you can pick a timeframe you are interested in studying.

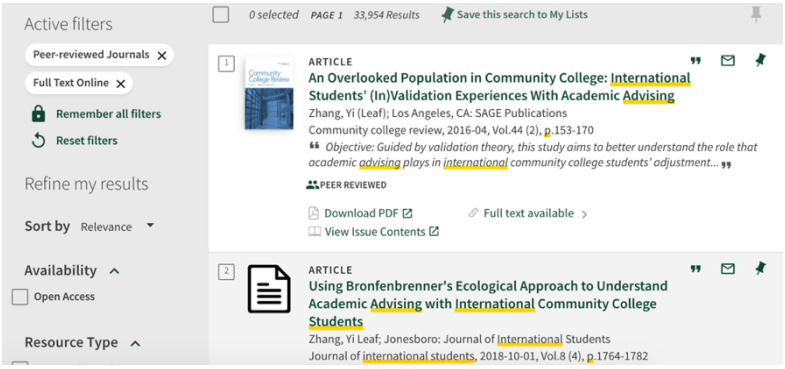


In my case, I am looking to learn more about international student advising in the most recent years, and I am only interested in looking for peer reviewed articles.

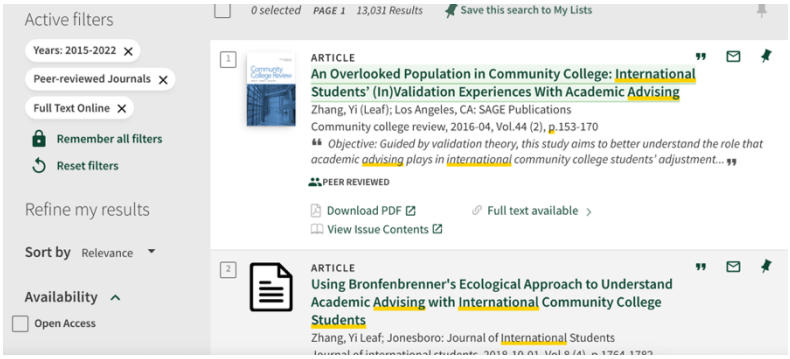
- On the left said of under "Availability," I'm going to pick "Peer Reviewed Journals" and apply the filter. Now, there are only 42,166 Results.



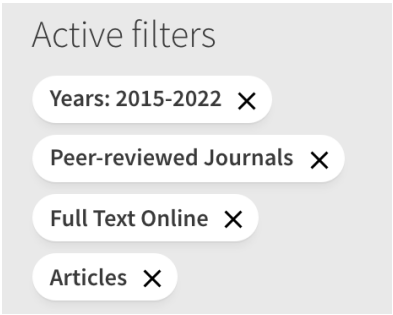
- I suggest choosing "Full Text Online" for easier access to University of Oregon students, this way, you will weed out all the journals that are not available or take a long time obtaining them. (If that is the case, do not fret, I will help you). Again, narrowing the search. down to *33,954 Results*.



- Next, under dates, I am going to choose from 2015-2022, and again, the available scholarly articles went down to *13,031* Results

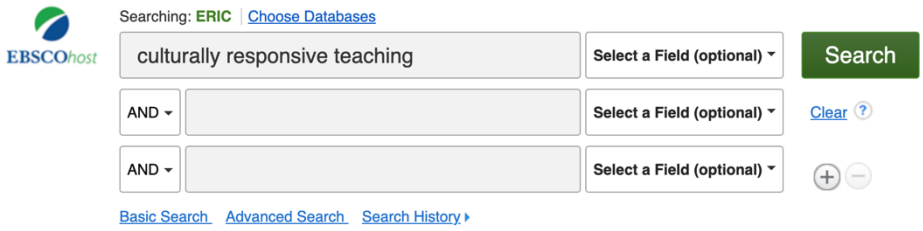


- A key step is to manually chose "Articles" under the Resource Type section (left side of screen)
- See how we went from *165,418* to 12,533 Results? That is good news. So just like that, apply all the filters necessary for your search, and one by one remove everything you do not need or cannot use. By adding more active filters, you are narrowing down the search for your literature review.

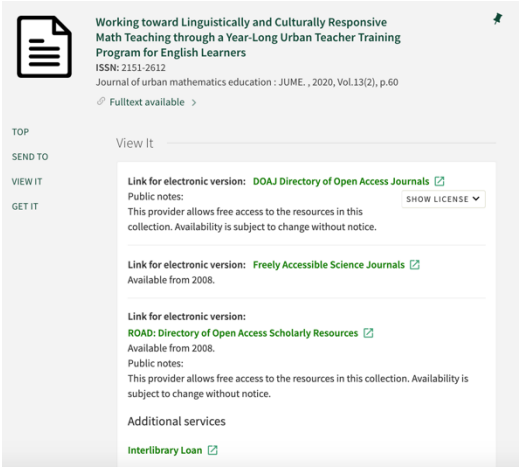


Step by step citations from UO Library – ERIC Database

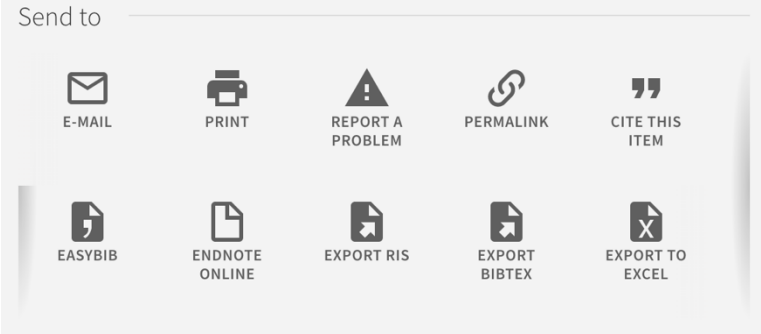
If we search for an article, first I am going to go to the database, find ERIC, and I am just going to search *culturally responsive teaching*, and then let us say I found an article that I wanted to cite. I am going to click on the Find Text Button.



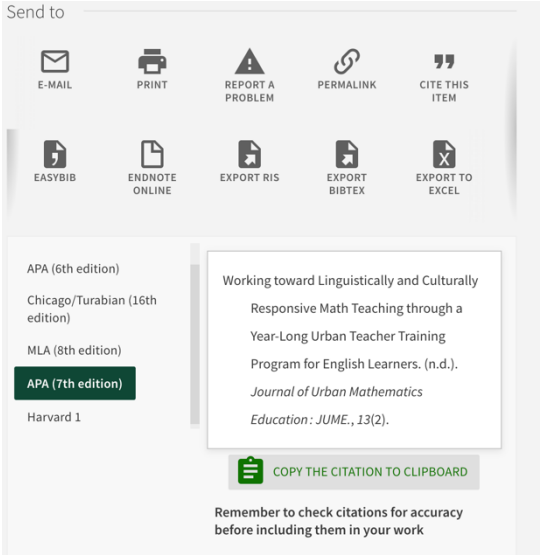
Then you will see it says this article is available for free via UO library. So, now you have full electronic access to your desired research article. You can choose to download the PDF version or continue to read it on the webpage.



If you scroll down on this same page, you will find that the University of Oregon library has this amazing feature designed to make your life easier. You can choose to cite this item directly from the UO website, but be sure to click on the APA (7th edition).



Working toward Linguistically and Culturally Responsive Math Teaching through a Year-Long Urban Teacher Training Program for English Learners. (n.d.). Journal of Urban Mathematics Education: JUME., 13(2).



Or you could use the export feature.

Chapter 3

Synthesizing versus Summarizing

BRT

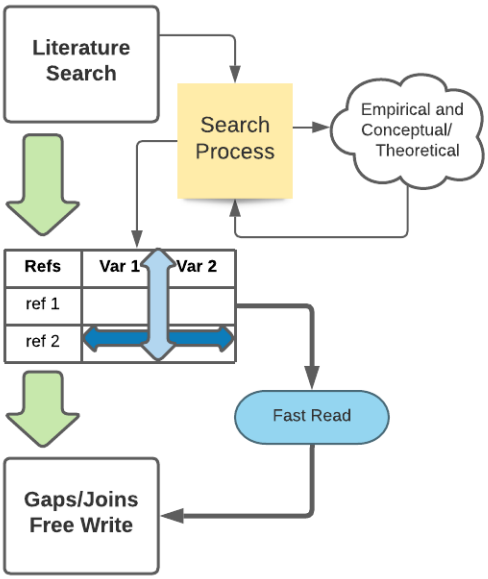
behavioral research & teaching

This chapter describes the process to synthesize not simply summarize research. A summary simply lists sets of studies in a sequence, reflecting concatenated information. The emphasis on summary is reporting and cataloging while the emphasis on synthesis is on integrating and concluding, the latter requiring disciplined conjectures that can be confirmed/disconfirmed. This distinction is important: Findings are distinguished from interpretations and validity is considered in the type of decision being made. Both interpretations and validity become essential elements of an argument, which is the topic of the next chapter.

In completing this synthesis, we propose a structured approach to (a) move quickly through the literature (references) you have collected, (b) build a table for organizing the literature, including both empirical publications (preferably meta-analyses, if available, as a start) as well as theoretical/conceptual papers to articulate variables and topics, and (c) frame a critical view of this literature to form a nascent argument (addressed in Chapter 4). This strategy provides a base for your synthesis that can preclude a simple literature summary that drones on with privilege to findings.

Appendix A – Avoiding Box Car Writing

The topics addressed in this chapter first describe the process in moving across a controlled set of references that have been assembled. The first two types of publications, meta-analytic and individual empirical studies, can be used to determine potential gaps and joints. The third publication type, theoretical/conceptual studies, center and anchor your paper, particularly with the constructs being referenced. We emphasize reading quickly and provide a few strategies to traverse a wide range of literature. We also describe a process for tabulating critical variables that frame information, allowing for comparisons across studies and publications.



Note that both empirical and theoretical/conceptual publications lead to a partially specified model that can then lead to operational applications (see Mosenthal, 1980). In the end, these two types of literature are designed to frame an argument, at least a nascent one. In this chapter, we illustrate meta-analyses, individual empirical studies, and theory/concept publications with examples. Finally, Appendices B, C, and D provide guidance on a planning document using WriteRightNow (WRN), an assignment, and an assignment review guide.

Moving from the Search to Synthesis

Once an initial empirical basis is established, you need to continue a **more directed search** using the initial journals you have found and continue to conduct more refined searches following a thread that is more specific. These additional references become part of the authoritative argument for your synthesis. For example, you might find an author who has a high quotient for

publications and is present on editorial boards in high impact journals. The search may reveal authors of handbooks or chapters in handbooks, whose authors have been selected to publish chapters only after a distinguished career in the field. Also seek out editors of special issues in the peer-reviewed journal. Again, these individuals have been selected to manage a special issue primarily because they are prominent in the field. The focus of continued searches allows you to continue gathering empirical references in high quality journals, which lends itself to making an authoritative argument.

As you continue to refine this personal database for your synthesis, it is also time to **scan the publications** quickly and briefly. Now is not the time to read them carefully but get the gist of the content (in the context of the key words you used in your initial search). This scan of publications should be broadly framed with attention to key variables, theoretical conceptual terms, patterns of publications. Consider explicitly scanning for author(s), dates, publication, tables, section headings, student samples and demographics, etc. As you scan the publications, consider how they can be stitched together into an argument.

This scanning is "a strategy for reading that allows you to use prior knowledge…to help guide your reading" (Barnet, Bedau, & O'Hara, 2020, p. 41). It also serves as a strategy for eventually developing a tabular approach to organize information in your synthesis. These authors also describe the *'first and last rule'* when scanning: Assume that the most essential information appears early and late in the study. A subrule for this strategy is to read the *first paragraph of the discussion section* to not only identify the results but understand their importance. Though the abstract is relevant, the first paragraph of the discussion covers the findings in a deeper way, providing a conceptual and high-level summary of the findings, including the variables described and/or manipulated, as well as an interpretation summary of the findings. Scan the *references* from the publication: They can provide a theme, even if only referring to the titles of the articles or the journals in which they appear. By combing through references, you can extend or restrict them where needed to eventually obtain an appropriate number for your synthesis. Also, review the *tables and figures* rather than the results. With tables, the *column titles* are the most important and telling, so ignore the values in the tables for now. Figure *titles* reflect the 'values' of the researcher and, in part, tell the story.

One tried-and-true approach suggested by many authors is to *highlight, underline, and annotate*. This suggestion, in our view is less than suitable for two reasons: (a) it delays the writing process, and (b) it ignores the eventual need to put structure on the content. Where this strategy comes into play, however, is to identify key content that can be copied-pasted into a paper to serve as a quote. And if used in this manner, do not forget to note the page number.

It is a challenge to identify a *gap* in literature when we have not read everything, so reading at this phase needs to be broad. Try to determine if trends or gaps exist. Also note that research often has a *time warrant* on it, allowing you to define a gap or a shift as the field matures. Use a bit of attitude about what you are searching for and use intersections of terms. Note that a gap exists until it does not, so make a concerted effort to look for refutation. And be careful if you find no references. Either your conjecture is unimportant or too complex.

Three Strategies for Placing Literature

In building tables for summarizing the literature, it is possible to begin with some obvious data to collect, such as an abbreviated notation of the authors, date, and type/outlet of the publication. Make the column title brief and the content of the cells informative but also brief, ignoring APA style for now. Eventually, these first three fields can be used to sort the entire table, so it is best to keep the date of the publication as a separate column. The first type, and most persuasive peer-reviewed publication, is a *meta-analysis*. They can provide you a quick start to the field that connects the past with the current results in a field (at the time of publication). Meta-analyses also provide a clue to the variables that are in common and are unique across studies, which can be used to identify further studies conducted since the meta-analysis. The next important peer-reviewed publications consist of *primary studies* in peer-reviewed journals. These publications present qualitative and quantitative data in tables and figures. Typically, they are structured in four sections: *introduction, method, results*, and *discussion*. Finally, it is important to include *theoretical and conceptual publications* to provide a central theme for your synthesis. Such papers also provide important structures for interpretation. Following are examples of each type.

A Meta-analytic Approach. This type of study can (and should be) searched explicitly on its own. This term came into the publication process with Glass (1977). He was in search of a formal process for compiling and comparing research findings in a standardized manner using a common metric. He developed the effect size (ES) as the standardized difference between two averages. A meta-analysis on any educational topic can be used to 'jump start' the critical variables used in summarizing stable findings. Typically, the studies selected all have a dimension in common (either as independent or dependent variables) and the purpose of the meta-analysis is to highlight their potential influence in terms of effect sizes. Note that the field of research now often requests effect sizes to be published when significance tests are used. So also look for them within individual studies.

In this example study on writing interventions, Gillespie and Graham (2014) asked two research questions: (a) are writing interventions, in general, effective for students with learning disabilities (LD)? and (b) which specific writing interventions are effective? This study used a meta-analysis to document the effect size for writing interventions with this sample in Grades 1 through 12. The authors eventually identified 43 studies to use in their research, using several criteria of the study to be included: (a) students had to school age (in Grades 1 to 12), (b) students had to be identified as LD with appropriate supporting information, (c) a writing intervention had to be the focus of the study, (d) an assessment had to be administered focusing on the quality of students' writing, and (e) the study had to use a true-experiment with randomization, a quasi-experiment with pretest data, or a within-subjects group design.

They conducted a meta-regression to assess the first research question (calculating a single e*ffect size* for all 43 studies they reviewed) and examined variability in e*ffect size* (second question) for each writing treatment (e.g., strategy instruction, dictation, procedural facilitation, prewriting, goal setting, and process writing). Moderator analyses also were applied to determine if specific study-level characteristics (e.g., study quality, explicit instruction) accounted for excess variability in effects. The authors found that writing interventions indeed have a significant positive impact on the writing quality of students with learning disabilities. They also determined that four of the six writing interventions were the most effective: strategy instruction, dictation,

goal setting, and process writing. The authors stated that the effectiveness of the interventions was only present when paired with instructions. Overall, the quality of writing improved significantly with the use of these interventions.

The authors mentioned that it was hard to locate all the studies that could have been done in this field and that each of the studies had their own limitations in the quality of research conducted. Some of the studies had to be excluded from their meta-analysis because they applied different writing quality outcomes: Near the end of the discussion, five lines are presented as a limitation that states "we limited our review to studies where *writing quality was the outcome measure*. Not all studies, however, applied the same quality measure, and a sole focus on writing quality excluded some types of writing interventions" (Gillespie & Graham, 2014, p. 470).

Well, this limitation missed 15 years of research in writing measurement conducted at the University of Minnesota Institute for Research on Learning Disabilities (IRLD), publications on assessing writing for students with disabilities, which this study targeted. What is important is that the previous research was based on *quantitative measures* because they are more sensitive to change than qualitative measures (like 1-5 on ideas and organizations sentence fluency, conventions). It is exceedingly difficult to show improvement in *qualitative measures*, particularly for students with disabilities. Improvement is likely to be glacial: A score of 1, for example, may exist for six months and only eventually creep up to a score of 2. So, this meta-analysis presented several important findings, but it was only confined to studies that used qualitative measures, which represents a significant gap in the literature. As a footnote: One problem with the previous writing literature associated with the IRLD is that it was based on handwriting, which has ended given the use of computers in schools.

A Tabular Approach. In this approach, a table is designed to capture your literature and then used to sweep across the variables and outcomes. And in this sweep, it is possible to identify some of the studies that are more or less important for your purposes as well as landmark studies, consistent authors, topics, and research methodologies. A more thorough analysis can then be developed by sweeping across *column* titles and *row* titles. You can look at the variables in the columns and quickly make comparisons. Importantly, you want a quick way to compare these different studies, which is why a table format is used. This strategy is much faster than taking copious notes in an uncollated manner. And it is much easier to see the parallels (consistencies and inconsistencies): Such a comparison can be used to group studies (when sorted on a column). Note that tables are best created in Excel® so that columns can be sorted.

This example technical report (Tindal, 2017) comes from research on oral reading fluency (ORF) that has been published literature for over the past 40 years, beginning with Deno, Mirkin, and Chiang (1982). This initial publication on ORF has spawned hundreds of research studies that have been published in scores of journals in these four decades.

Several critical variables in the research base are tacked in columns: student grades, types of students, measures used, frequency of measurement (number of measures), slope (how it was calculated, and outcomes at two levels (averages and growth by season). Note that this database was confined to students in Grades 1- 5, with far fewer students from Grades 6-8 and no students

from Grades 9-12. Furthermore, some studies used informal passages, while others used one of three formal passages: CBM-Passage Fluency (ORF-PF) or CBM-R, DIBELS®, AIMSweb®, and easyCBM®. Another important note is that the analyses were restricted to only linear models of growth, though more recent studies have used more advanced multilevel models to measure growth as both a at level 1 (student), 2 (teacher) and 3 (school). In the end, a technical report was developed with references ordered from the earliest to the most recent. See Figure 1 below.

Figure 1

Sample Variables using a Tabular Approach

Authors (date)	Grades	Students	Measures	N-Measures	Slope Calculation	Averages and Growth – WCPM
Marr, Algozzine, Nicholson, & Dugan (2011)	Grade 2: 14 elementary schools	17 coached 17 control	**DIBELS** (Good & Kaminski, 2002)	Three administrations: Fall, winter, and spring	Ordinary Least Squares (OLS): One between-one within ANOVA Follow up t-tests	Averages: Control 32.5, 51.7, 70.7; Treatment 43.5, 79.5, 96.9 Growth: Control 19, 19; Treatment 35, 17
Keller-Margulis, Clemens, Im, Kwok, & Booth (2012)	Grades 3-5: Grade 3 (n=1,838), Grade 4 (n=2,151), Grade 5 (n=2,332)	Non-ELL, ELL, and ELL-Monitor	AIMSweb CBM-R passages (2012)	Three administrations: September, January (14 weeks later), and May (14 weeks later).	A piecewise model was fitted to the data that modeled growth	Averages: Grade 3 82.7, 102.8, 118.0; Grade 4 99.1, 115.8, 129.5; Grade 5 112.3, 126.5, 140.0 Growth: Gr 3: Non-ELL 20, 15; Gr 3: ELL 19, 17; Gr 3: ELL-M 20, 15; Gr 4: Non-ELL 17, 13; Gr 4: ELL 15, 12; Gr 4: ELL-M 17, 15; Gr 5: Non-ELL 15, 13; Gr 5: ELL 15, 13; Gr 5: ELL-M 14, 15
Nese, Biancarosa, Anderson, Lai, Alonzo, & Tindal (2012)	Grades 3 to 5: 2,465 students	Student gender, free and reduced-price lunch, ethnicity, special education status, and limited English proficiency	easyCBM passages	Three administrations: Fall, winter, and spring	Hierarchical Linear Model (HLM) for linear and discontinuous growth	Averages: 3* 74.5, 106.9, 107.5; 4* 102.3, 122.9, 130.9; 5 134.5, 143.4, 156.0 Growth: 3* 32, 2; 4* 24, 8; 5 10, 14 **Reflects curvilinear growth. N.B. Differences in intercept by student demographics and in slope for SWD.*

Developing a table allows you to review several studies in a quick fashion and find something, a gap, or a seismic omission, as an impetus for your synthesis. You can compare these different authors/studies to document certain measures and authors consistently appear together. Such higher-level conjectures or assertions become the substance of your synthesis. And with this, you move from summaries to synthesis on any of these variables (students, research designs, measures, analyses, etc.). For example, a variety of research questions can be posed with this database that are important to validate in documenting performance (benchmarks) and progress: (a) are differences present in the types of students being studied (what do we know about student demographics such as their grade levels as well as race-ethnicity or English learners), (b) what are the primary types of passages being used, both informally selected as well as formal standardized instruments, (c) what is the typical frequency of measurement administration, (d) how is growth (or change) documented, and (e) what differences are present in the averages (or slopes) and are these differences a function of the measures (particularly with the commercial measures). Of course, any combination of these variables can also be addressed such as what differences exist in the slope for different student samples and passages. Had study design been documented, it would be possible to investigate qualitative vs. quantitative or experimental vs.

quasi-experimental. Note that a variable does not need to apply to every single one of the studies that are reviewed; indeed, such omissions may become part of the story itself. Although it is unlikely that literature presents wildly inconsistent studies. In the end, it is likely to have too much information, therefore, be prepared to go back to your search and work in delimiters. On the other hand, consider warrants that can be used to identify inconsistencies, if not gaps. In summary, the sweep of the columns/rows of the table can be organized into the following buckets. In a later chapter (5), we emphasize transitions that can be coordinated with these buckets. Lump topics and variables together for a targeted review.

Table 1
Comparisons of Studies

Agreement / Addition / Similarity	Look for agreements across studies, particularly in any of the findings.
Opposition / Limitation / Contradiction	Look for disagreements across studies, particularly in any of the findings.
Time / Chronology / Sequence	Look for trends in topics or findings; identify longitudinal studies.
Space / Location / Place	Look for consistent samples, institutions, or settings

Sample overarching questions in reviewing the research literature
• Are findings in agreement/disagreement? Are similarities present in the methodology?
• What changes are present in the variables being addressed over time?
• Is power adequate to detect an effect in such a large sample with this method?
• What variables are repeatedly being reported as important?
• Are any interactions present with race and other student characteristics?
• What are the short-term and long-term benefits?
• Are different benefits present according to the variables being studied?
• Are important interactions present as a function of being a minority student, being low income (examples: free and reduced-price lunch status)?

Qualifiers on patterns can also be noted. For example, if longitudinal studies are found, it may be important to note this (and compare them with studies done at a point in time). It also might be beneficial to note landmark studies or a newer study from important researchers in the field. Such qualifiers make reading the synthesis more interesting. It is as if you are hearing the voice of the author talking in your head saying that the findings are consistent, or that some studies are more important than others and why that is. These highlights add personality to the paper.

As you grow the introduction, you do not have to wax heavily on the details. Basically, build it around a logic that can be filled in later as you bend the literature with different variables. This allows you to dig more deeply into findings later. For example, you can put stem sentence starters that you expand upon later. You want to start moving from tables to text that tells the story. It is a fast way to compare studies and document gaps or inconsistencies, which feed into the argument and form the gist of your paper. Consider these sub-topics to create a landscape of importance around research. Consider the highs, the lows, the qualifiers, the limitations.

A Theoretical/Conceptual Approach. In contrast to an empirical approach to frame your synthesis, a theoretical/conceptual approach may be appropriate; and of course, the two may and should be blended. Theoretical/conceptual publications may not present data but represent models for interpreting findings; they may point to formal theories that can be applied in research (e.g., using a Piagetian approach to studying the use of accommodations for assessing students or a developmental approach to investigate early reading acquisition). Theoretical papers may also present reviews of research that is not a meta-analysis but brings disparate findings into a holistic representation, with the theory scaffolding common interpretations.

In the example for this approach, two references were used to frame a study (Tindal, Irvin, Nese, & Slater, 2015). The first reference was a memorandum from the state legislature that required all students in Oregon entering kindergarten to take an assessment (to determine if they are ready). This mandate was an impetus for conducting a study on entering kindergarten skills. The second reference was from Sfard (1998), who wrote on conceptions of learning as metaphors of participation and acquisition. It was a beautiful juxtaposition for the authors to position the study because it provided a conceptual whole, with practice based on theory. These authors centered their synthesis on these two concepts/constructs: social and academic behaviors.

<u>They focused on three research questions:</u>

1. What are the levels of performance in both skill acquisition and classroom participation /Interaction when children enter kindergarten?
2. How do the items and measures consistently cluster into a score that can be reported?
3. Can a structural relation be developed and tested between teacher judgments of student interactions in the classroom and student achievement (proficiency in literacy and number operations)?

Their sample of students was based on a survey that the Oregon Department of Education sent to school districts to solicit interest in piloting an assessment for kindergarten entry. Superintendents were invited to nominate schools for participation. In the end, the researchers obtained data from 32 teachers and 1,228 students, representing16 schools in 13 districts. Demographics were summarized at two levels: *student characteristics* (included information on racial/ethnic diversity, socioeconomic status, English language learners, special education status) and *school characteristics* (rural/urban, school size, and kindergarten program offering).

The primary measure was The Oregon Kindergarten Entry Assessment which consisted of easyCBM® early literacy tasks such as letter naming fluency, letter sound fluency, phonemic segmentation fluency, as well as a numeracy task targeting numbers and operations. They also used a child behavior check list with 16 items addressing task and social behaviors. The authors provided a descriptive summary for all measures and then conducted an exploratory factor analysis (EFA) on a subsample, along with a structural equation modeling (SEM) on the remaining sample. This latter analysis allowed them to investigate the interplay between these skills and task-social behaviors and explain the level of achievement skill proficiency upon entering kindergarten.

The researchers reported that “descriptive statistics showed quite low performance in literacy measures and more normal distributions in mathematics and across various behavioral ratings. The EFA findings established three factors (social behaviors, task behaviors, and achievement),

and the replication of the EFA confirmed these same three factors. Finally, the SEM established a model in which social and task behaviors (participation) influenced skill proficiency (acquisition) that anchored as our theoretical framework" (Tindal et al., 2015, p. 312).

Some limitations were noted. The results only partially addressed the reason for its administration by documenting entry skills and potentially targeting important skills to be taught. Furthermore, given that the study was a pilot, no information could be provided about change over years or disparities among subgroups. Finally, the assessment was administered early in the school year and teachers were not familiar enough with their students and the possible differences between school districts.

Nevertheless, the most important aspect of this study was that it used an entirely different approach to framing the literature than the use of a meta-analysis or tabular approach. In a theoretical/conceptual approach, the big idea is framed at the start, representing the trail head of the research. It provides extensive ideas that, eventually are woven into a deductive argument (addressed in Chapter 4). A table was not created to determine (in)consistencies or gaps. Rather, an approach was determined ahead of time, which could have been developed either as simply a descriptive, exploratory study or a hypothesis. In this study, the former approach was taken, though the authors tended to be surprised that such 'causal' modeling was in the direction of task behaviors explaining achievement levels. An informal explanation is that students who listen to teachers, follow directions, etc. are more likely to achieve more skills (i.e., for each point on the behavior checklist, students gain 6 points on achievement). Furthermore, the counter is also true: Students who socialize more, are likely to achieve less (i.e., for each point on the behavior check list, they achieve 3 points less on the achievement scale).

From Synthesis to Argument

Now that you have literature scanned and compiled, it is time to develop an argument of your own. Most experienced researchers consider their work as both a scientific expression (with evidence) but one that also tells a compelling story. This may be the most difficult part of the synthesis process. As you grow the literature, begin to frame an argument, which is addressed in detail in Chapter 4. After that, you can then shape the literature synthesis, using different 'hooks' with structure and transitions (see Chapter 5).

First, ***summarize your search process*** to give the reader the message that that you were careful and methodical in your search without boring them to death. It is designed to provide a lens for how articles were selected. This paragraph should be placed early in the paper as a lead to the main literature synthesis. The search paragraph of a proposal should be in the past tense: "I searched these data bases, and I used these search terms, which included the following number of references at the start of the review process, etc." This paragraph is about succinctly describing how you came across the articles that you are summarizing and synthesizing, and it should be no longer than a half a page at most.

Second, begin to **synthesize your literature** by freewriting, listing, and diagraming. Free writing is simply writing "for five or six minutes, nonstop, without censoring what you produce…free writing should be totally free" (Barnet et al., 2020, p. 201). Listing is what the name implies: Generating a series of topic and subtopics that need to (eventually) appear in your paper.

Diagramming consists of graphically grouping sets of studies in a relational manner (a sequence or according to various commonalities), which provides a useful visual clue on how topics are related, reflecting clusters, branches, and sequences (headings and subheadings).

Tindal, Nolet, and Blake (1992) provide graphic organizers (GOs) to use in consolidating information and synthesizing it in a logical manner. This publication provides several specific examples in organizing research into a consolidated representation (diagramming as noted above). These GOs can reflect your perspectives on how disparate information is related. For example, they display the following: (a) thematic maps, (b) problem-solution maps and outlines, (c) sequential-episode displays as well as series of event chains, (d) compare-contrast charts and matrices, (e) spider (hub and spoke) graphs, (f) network trees, (g) fishbone maps, (h) cycles, and (i) interactive outlines. All these GOs can display information in an effective manner that highlights relations. Then, in the text, the rationale of these relations can be explained.

In moving to synthesizing, *close reading* needs to be deployed. Barnet, Bedau, & O'Hara (2020) consider the process as 'reading fast and slow' with this latter form becoming quite focused on terms, key findings, and inferences that can form the basis of a formal argument. In this process, definitions become critical, particularly for concepts. This step provides the basis for validation, clarification, and extension of ideas. These authors also present several strategies for organizing the *discourse structure*. As described earlier, the *first step* is to cluster supporting points with counterpoints and opposing points with counterpoints, beginning with the most basic issue and eventually complexifying. The *second step* involves asking a series of questions to address elements and components (definitions), similarities and differences (compare-contrast), relations among issues or variables (causes and effect), and primary opinions and sources/forms of evidence (justifications). Finally, *the third step* is to examine the assumptions (both implicit and explicit) behind any study or claims. These three steps can be used to summarize and paraphrase: "When you summarize, you're standing back, saying briefly what the whole adds up to; you're seeing the forest, as the saying goes, not the individual trees. When you paraphrase, you are inching through the forest, scrutinizing each tree" (Barnet, Bedau, & O'Hara, 2020, p. 58).

Tindal, Nolet, and Blake (1992) further describe two critical components of this last step (critically thinking) for you to synthesize research and begin to frame an argument. The *first* component is knowledge forms, comprised of facts, concepts, and principles. Facts are single declarative statements (note that they do not need to be true). Concepts are constructs with attributes that allow examples (and non-examples) to be clustered. Note: Your research is likely to deploy constructs. Finally, principles are if-then or cause-effect relations. The *second* component to consider is knowledge forms, comprised of reiteration (word for word repetition), summarization (condensation of information), illustration (exemplary), evaluation (judgmental values for or against), prediction (given certain conditions, specifying an outcome), and explanation (given an outcome, specifying the conditions). Together, these knowledge forms and intellectual operations can be useful in moving into the synthesis phase of writing.

Overarching questions in setting the stage for an argument

- Are key *concepts* defined and can they be used in framing warrants?
- If *principles* are described, how can cause-effect relation(s) be used in your own argument?
- What *intellectual opera*tions can be used as models for your own arguments?

- Can you take advantage of other researchers' *summaries* to cover a large amount of content 'real estate' that also serves as shorthand for stitching the 'parts' into a 'whole'?
- Do studies use *illustrations* that are comprehensive, and do they effectively reflect minimum-maximum examples?
- What (program) *evaluations* have been done that provide data to build the logic toward your argument?
- *Predictions* from previous research (and outcomes) provide a quick summary of the field and can be used focus your own synthesis.
- *Explanations* can be used as models for your own research and lay the framework for an argument that extends them.

In summary, you are shifting from *reporting to framing* information in a specific context as the base for an argument. The goal of a synthesis is not to unearth every study ever done on a topic, but to select a body of evidence that can be shaped into a compelling argument (with evidence, warrants, and claims) with evidence-based research/practice and begin structuring a compelling argument, and one that 'anticipates counter-arguments' from others. In this process, add your own voice, allowing for explanations, examples, problems, and extensions. Also note that your synthesis eventually needs to shift to an actual defense of your *proposal*, which at the very least includes a method section. Another shift eventually needs to be anticipated during the defense of the *dissertation* or thesis, which is a discussion section. So, synthesize the literature with these last two components in mind and realize that you are working on a document that continues to expand. And throughout the process, add your own voice, allowing for explanations, examples, problems, and extensions.

Appendix A – Avoiding Box Car Writing

Appendix B – WriteRightNow with Prompt, Concepts/Vocabulary, and Response

Appendix C – Assignment 3

Appendix D – Assignment 3 Review

Book References

Barnet, S., Bedau, H., & O'Hara, J. (2020). *From critical thinking to argument: A portable guide*. New York: Bedford/St. Martin's.

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Appendix A – Avoiding Box Car Writing

Standing next to the tracks when a train is traveling is likely to make you feel dizzy (particularly if you stand too close). Pretty soon, the monotony of box cars or oil tanks, passing in front of you, one after the other, creates a lull on thinking. You could try to count them, but that might be worse than counting sheep to bring on sleep. This phenomenon can also occur in writing when statement after statement is presented in successive fashion. This effect is particularly possible when writing nonfiction, irrespective of content. Facts are successively presented, one after the other. Boring. Then sleep. This type of writing can be characterized as 'box car' style.

The best strategy to avoid this style of writing is to create a story line with structure that weaves together various statements. The story line can be built on any number of transition devices that offer different effects. The following transition devices are offered in https://www.smart-words.org/linking-words/transition-words.html. As the authors of this resource write "As a 'part of speech' transition words are used to link words, phrases or sentences. They help the reader to progress from one idea (expressed by the author) to the next idea. Thus, they help to build up coherent relationships within the text." Approximately 200 such devices are possible in the English language. The purpose is to create tension, expectations, agreement-disagreement, shifts in tone, etc. Transition devices are more typical across paragraphs than within but should be considered at any level. The following are categories of transition devices from the weblink above (all of which are quoted from the site). They are used to compile research summaries.

- *Agreement / Addition / Similarity* – The transition words like also, in addition, and, likewise, add information, reinforce ideas, and express agreement with preceding material.
- *Opposition / Limitation / Contradiction* – Transition phrases like but, rather and or, express that there is evidence to the contrary or point out alternatives, and thus introduce a change the line of reasoning (contrast).
- *Time / Chronology / Sequence* – These transitional words (like finally) have the function of limiting, restricting, and defining time. They can be used either alone or as part of adverbial expressions.
- *Space / Location / Place* – These transition words are often used as part of adverbial expressions and have the function to restrict, limit or qualify space. Quite a few of these are also found in the Time category and can be used to describe spatial order or spatial reference.

In WRN, the examples of transition words and phrases can be entered as concepts and vocabulary, using the list provided in this website. In a very quick manner, it is possible to highlight the major categories used to determine if they are consistent and create the correct/intended structure.
Moral of this Blog: Writing structure is best conveyed by using some type of transition device which need to be considered on a holistic manner. Once developed, it's best not to mix metaphors and use too many of them, either within or across their types.

Appendix B – WRN Prompt, Concepts/Vocabulary, and Response

Describe the variables and the topics that you think best fits your literature synthesis. List the column titles of the table you plan to use in synthesizing the literature.

Use any/some of the following concepts (underlined phrase below) and the vocabulary words within them.

Concepts/Vocabulary

Variables and topics: administration, assignment, ages, author, controls, concepts, date, data, design, duration, experimental, grades, groups, instruments, interventions, interval, items, materials, measures, method, number, journal, outlet, outcomes, parents, participants, peer review, publication, random, reliability, results, scales, schools, settings, stratify, students, study, survey, teachers, technical adequacy, time, type, qualitative, quantitative, analysis, theory, training, validity

Response

In the kindergarten assessment study, several variables could be used to structure the literature:

Author and Date

Kindergartner demographics
Ages
Settings

Measures and Instruments
Social
Academic

Administration Issues
Amount of time
Number of items
Administrator bias control
Reliability and consistency of administration
Timing of assessment

Note: A conceptual framework is desperately needed along with policy mandates and urgency of documenting early success in school.

Appendix C – Assignment 3

Develop a table to reflect these variables and topics and use them in developing an outline.

(Tindal, 2017) summarizes the literature on oral reading fluency…See Technical Report 1701. *Say more about the organization of variables in your table as they relate to the problem of practice and the results of the search process…*

Introduction
In the area of oral reading fluency, several studies have been conducted and can be compared on several dimensions…

Populations (Samples and Demographics) …
Student sample size and breadth with both small sample studies and large samples used in the creation of norms…
Specific populations have also been studied…

Measurement Issues and Treatment Sensitivity…

Instrumentation and Analyses of ORF Data Sets includes…
Unspecified measures…
DIBELS
AIMSweb
easyCBM

Frequency of Measurement is a variable that includes…

Analysis for documenting growth is a key issue that…

Outcomes on ORF Performance and Change over Time…

Conclusions and Implications…

Assignment References

Tindal, G. (2017). *Oral reading fluency: Outcomes from 30 years of research*. Eugene, OR: University of Oregon Behavioral Research and Teaching.

Appendix D – Assignment 3 Review Guide

Develop a table to reflect these variables and topics and use them in developing an outline.

Note 1: The description of the table should be in outline form with the gist of topics addressed. In reviewing the document, consider the following issues.

Note 2: The following bulleted list is only suggestive, and all questions need not be addressed.

• Does the table fit the problem of practice being synthesized?

• Are key terms and definitions either present or possible to explicate?

• Do the dates of publications reflect currency or developmental trajectories?

• Is a distinction made between primary and secondary research publications?

• Do the column titles reflect important variables in this area?

• Does the information within each cell summarize important content?

• Are some of the variables focused on methodology? See Galvan and Galvan (2017), Chapter 6.

• Are key findings (statistics) present in some fashion?

• Are critical variables (columns) included that enhance or detract from the study?

• As you move across columns, is the study effectively summarized (reflecting an important reference in the literature)?

• As you move down rows (studies), can important comparisons be made?

• Are consistencies or inconsistencies present that can be highlighted?

• Is the outline arising from the table coherent with a structure that controls the traffic of information (more about that later with box-car writing; this is just a prelude)?

• Is the writer ready to make the jump from summary to synthesis, from findings to conclusions?

• Given the next assignment is about argumentative writing, is sufficient content present (columns and rows) to (eventually) make a claim (with warrants)?

Chapter 4

Developing a Perspective by Framing an Argument

BRT

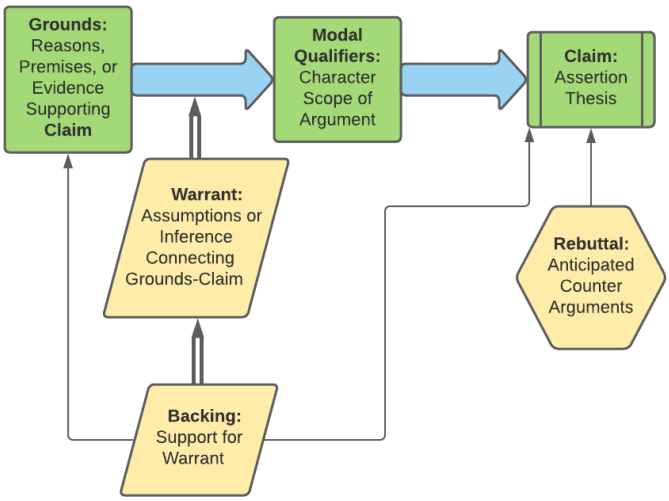
behavioral research & teaching

Many writing books do not mention argumentative writing in research writing and focus primarily on writing style or writing methodology. In contrast, we consider argumentation as central to any research synthesis. Writing style and methodology need to be addressed, but they are only part of the story, and are in service of argumentative reasoning. This argumentation, however, must be disciplined, not only in everyday discussions but especially in research. As our social discourse has become increasingly polarized, it is important to analyze the perspectives and assumptions, as well as the logic and reasoning that are often hidden and implicit. As 2020 revealed, political 'conversations' often were based on fallacious assumptions and conclusions. Practicing logical reasoning in these environments can be useful in helping you become fluent in the specialized language of research.

Appendix A – Fallacious Assumptions and Conclusions

Formal Arguments using Toulmin Model

In this chapter, we focus on arguments using Toulmin's model, the author most widely referenced in typical courses on debate. This style of argument is formal with six primary components as illustrated. Often, logic is applied to language and less to research. We believe, however, that these six components fit within a research paradigm, whether it involves an experimental study that is hypothesis-driven, or a simple descriptive study. The Toulmin model of argumentation is famous for its utility in testing the validity of an argument. After presenting the definitions for each term, we extend it with examples. In a typical illustration of this method, the main three components move from grounds to (modal) qualifiers and end on a claim. Supporting these three components are subsidiary warrants and backing that connect the grounds to the qualifiers; in the end, rebuttals are considered.



• **Grounds** (evidence) are used to make the claim plausible and serve as the premises; they differ between deductive arguments (the premises) and inductive arguments (representing samples, observations, or experimental results).

• **Warrants** connect the claim to the grounds and serve as guarantees, evidence, or principles supporting interpretations relating the grounds to the claims.

• **Backing** is needed to ensure the warrants are good, reasonable, or rational.

• **Modal Qualifiers** limit the argument and refer to the argument's *character* (ranging from necessary, probably, plausible, or possible) and *scope* (always or sometimes true).

• **Claims** can be general or specific.

• **Rebuttals** anticipate the eventual support that not only why something is true by why its counterpart (untrue) is wrong.

In summary, the primary questions to address in a Toulmin model argument consist of the following.

1. Claims – What is your argument?
2. Grounds – What is your evidence?
3. Warrants – What reasoning connects your evidence to your argument?
4. Backing – What can you provide as support to convince the reader to agree with your grounds, claims, and warrants?
5. Modal qualifiers – What are the limits to your argument?
6. Rebuttals – What are the objections to your argument, and can you reason that your argument still holds?

With this structure, it is possible to revisit the summary table constructed from the Chapter (3) and begin the process of making claims, which are often based on gaps in the literature. The main components of an argument may also include an examination of the authors' main thesis (located by attending to transition words implying a conclusion and a verb implying an explanation), the author's purpose, the main or primary methods used to deliver the argument (references and evidence), the author's persona (which may be related to their method), and the author's audience (the journal in which the publication appears). These components can feed into either the grounds or the warrants which, in turn, feed into the modal qualifiers and the claim. The backing for the warrants might come from the data and references included in your table.

Other authors have added their own embellishments to this basic structure. For example, Efron and Ravid (2019) discuss claims of facts, values, policies, and concepts. They also consider qualifiers, perhaps only with certain populations, only with specific measures, or only with some designs of studies. Finally, they note that claims need to be considered 'on point,' with evidence offered in terms of accuracy, precision, authority, representation, currency, and relevance. Cooper (1998) considers several elements of claims: trustworthiness, populations, control variables, and the validity of the outcome measure (but remember, validity applies to decisions and inferences, not measures).

A Logic Example – Equal Pay. In this example, we reverse thread this structure and start with an example from Barnet, Bedau, and O'Hara (2020). A claim is made that *men and women need to get equal pay for the same jobs*, or *the equal pay act of 1963 must be revised to guarantee that men and women get paid equally for the same jobs*. This claim is then followed by grounds which provide evidence behind the claim, which as we describe next in the chapter as deductive (providing a premise) or inductive (providing empirical results/observations). Grounds for equality in pay may reference data from various market sectors where inequality exists. The next step in structuring the argument are warrants that are used to establish the argument. In the example of equal pay, reference can be made to equality in skills, training, and responsibility, etc. among men and women. Consider the warrants as bridges to how data are related to the argument. Setting up the convincing warrants is then followed by backing and further relevant support.

For example, some sectors of the economy may reflect unequal pay even though the skills, training, and responsibility are the same. Or backing could be garnered in market sectors, though not widespread, that reflect equality in pay with no deleterious effects (e.g., profit margins are not lessened). This backing may establish modal qualifiers to help the reader understand whether the argument is necessary, probable, plausible, or possible (or result in outcomes that occur rarely, sometimes, or often). In our example, we could use this backing to invoke equality in pay as possible. The last component is a rebuttal, acknowledging that the argument may have flaws but is still the best option on the table. In equal pay, for example, a rebuttal may be invoked in certain occupations that require exceptional strength (e.g., iron workers) even though outliers may be present.

A Research Example – Transition Matrix. This example of an argument comes from a study impelled by a policy claim (Efron & Ravid, 2019). The claim: It is difficult to show progress in state accountability systems for students with the most significant cognitive disabilities because of poor measurement models, even though federal legislation requires their participation. Recently, this legislation had changed from *No Child Left Behind* to *Every Student Succeeds Act* but still required this group of students to take annual state tests (with 95% participation, to be included in the state accountability systems). Some were blind, some were visually impaired, some were orthopedically impaired, but all of them with the most significant cognitive disabilities.

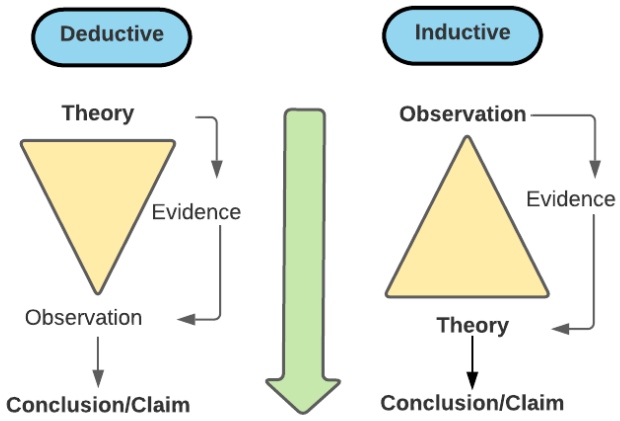
The evidence included the following: Two different authors (Hill, 2006; Schafer et al., 2012) were studying this issue and had presented data on the limited success for using transition models to document growth. Transition models allow student performance to be categorized into a proficiency level (from low to high) and track 'growth' as movement (from year to year) across these categories, even though the measurement system was not vertically scaled. They justified this research based on correlations across the transition models and that, even though the models made different assumptions, the consequent rankings of schools were similar (Tindal, Nese, & Stevens, 2017).

Tindal et al. (2017) use three warrants to connect the claim of growth using transition models (with backing from the research literature). First, serious measurement problems exist in using proficiency categories: Not only is assignment into categories frail (by using fallible standard setting procedures), but measurement of improvement requires vertical scales. Second, too many assumptions are being made that use various weighting criteria across the proficiency categories (e.g., it is easier/better to move from very low to low than proficient to advanced). Third, this metric of change ignores whether improvements are occurring within categories, particularly given the population (students with the most significant cognitive disabilities). These warrants connect the claim with the grounds (evidence) using a modal qualifier: It is possible to scale improvement in a more sensitive manner if 'within' proficiency category performances are addressed, and if transition models use countable values without weights to show growth.

One counter argument could be anticipated in the final metric used to judge one transition model over another: Ordering percentile ranks by school over cohorts using the consistency of each model to reflect existing reports. Furthermore, at the time, an 'opt out' movement had begun in which parents could refuse to have their child participate in state testing programs, thereby rearranging the population of students taking the test (e.g., skewing it toward very low students only).

The authors used external dataset from a longitudinal study including three cohorts of students from Grades 6 through 8 (with 25,486 students across 243 schools). Specifically, the authors focused on comparing seven models of growth by tracking consistencies in transitions from each year. Measuring students transition reflected different ways of measuring change from (a) very low to low, (b) low to proficient, and (c) proficient to advanced. The authors attended to the reliability of the matrices, in addition to the validity of inferences of growth using these models. They reported that student performance was stable within the category brackets and that significant differences occurred among models when using a school's effect index. They presented evidence that the simplest model (using countable values with no assumptions) was the most defensible and consistent.

Deductive and Inductive Reasoning



As noted earlier, the grounds for making a claim may be either deductive (providing a premise) or inductive (starting with observations). "Either we make explicit something concealed in what we already accept (deduction), or we use what we have observed as a basis for asserting something new (induction)…Both deductive and inductive reasoning seek to establish a thesis (or reach a conclusion) by offering reasons. Thus, every argument contains both a thesis and one or more supportive reasons" (Barnet, Bedau, & O'Hara, 2020, p. 337). Each type of reasoning starts at a different reference point. In comparing them, they state that "in studying the methods of induction, we are exploring tactics and strategies useful in gathering and then using evidence – empirical, observational, experimental – in support of a belief as its ground. Modern scientific knowledge is the product of these methods, and they differ somewhat from one science to another because they depend on the theories and technology appropriate to each of the sciences" (Barnet et al., 2020, p. 363). In contrast to this view, we follow a model proposed by Popper (2002) based on 'disconfirmability', which reflects the capacity of findings to be falsified. In this view, science is inherently deductive, as it is impossible to move from observations to theory: Singular events can never become universal.

One note of caution, irrespective of reasoning type: Causal argumentation needs to error on the side of understatements. Movement from evidence through warrants and qualifiers to claims is not absolute but conditional (even beyond possible warrants with backing). Typically, by addressing associations, links, or mechanisms, it is easy to inadvertently use causal language. Nevertheless, distinctions need to be made that differentiate correlation and causation. For example, a hot temperature outside may be associated with eating ice cream and slurries, but the temperature does not cause such behavior. So, the full range of mediating and moderating variables need to be considered in rendering an argument. Finally, claims and conclusions need to be capable of being disconfirmed.

A Comparative Example – School Consultation Training Program. In this last section, we bring together Toulmin's model of argumentation with two types of reasoning using a study of a consulting teacher training program (Tindal & Taylor-Pendergast, 1989) This program trained special education teachers to become consultants with general education teachers. At the time, most consulting books emphasized the interactive nature of consulting: how to be friendly, build relations, be nice, and play in the same sandbox without stepping on toes and telling teachers what to do. Instead, these researchers organized consulting into 13 different behaviors and had practicing student consultants self-document time spent in these different activities. In the two forms of reasoning illustrated below, we address a theory of consultation to identify important components that can be taught in a coherent manner. The following illustration of Toulmin's model for argumentation is applied both deductively and inductively, based on the consultation process as described by Sugai and Tindal (1993). This example can be further illustrated in research published by Tindal and Taylor-Pendergast (1989) as well as Tindal, Shinn, and Rodden-Nord (1990).

Deductive Model: Start with a *theory-hypothesis* to make the claim, highlighting a *behavioral approach* (vs. cognitive-behavioral or psychosocial approaches).	**Inductive Model**: Start with *samples, observations, or experimental results* to document varied consultant skills and activities to develop a theory.
Claim: A *behavioral approach* to consultation can be used to organize the necessary skills for students in training to be successful in becoming special education consultants.	**Claim:** Several different activities are to be documented in developing a theoretical approach for training students to be successful special education consultants. This approach is universal.
Grounds are the *premises:* Consultants must focus on students' IEPs, address diverse academic and social skills, and reflect developmental stages (ages/grades).	**Grounds** are *from the field*: Prior studies of consultants in action (anecdotal reports, running records, observations, etc.) have illustrated a range of skills.
Warrants *link the claim and the grounds*: Behavioral consultation was developed in the 1960s with Applied Behavior Analysis (ABA) and has dominated treatments in varied settings. This consultation model is further warranted with the use of response-to-intervention models (RTI) for the identification of special needs and support of students with disabilities in which tiers of support are tested over time.	**Warrants** *link the claim and the grounds*: Self-reports and direct observation are grounded and emphasize a widespread set of skills that reference (a) personal relations between teachers, (b) a range of settings, (c) different service delivery models, and (d) support for varied student needs. These different skills can be clustered into a cohesive approach to consultation.

Note: This table is continued on the next page.

Backing *supporting warrants*: Most students with disabilities are being served in general education classrooms (see 42nd Annual Report to Congress) and many different interventions can be implemented there **and** be successful.	**Backing** *supporting warrants*: Both objective and subjective reports from consultants as well as consultees have consistently documented both successful implementation and positive perceptions along with cooperative relations.
Modal Qualifier: The outcomes (documentation of specific skills) are *plausible* for defining a behavioral approach, as they were designed with this theory in mind, given the presenting problems and classroom demands.	**Modal Qualifier:** The outcomes (documentation of specific skills) are *possible* for defining a theoretical approach, but the results may be thin. Many theoretical approaches can be invoked in organizing the skills.
Rebuttal: The skills may not be generalizable across settings or types of students (needs and ages).	**Rebuttal:** Coding of data presents difficulty in defining a theoretical approach to consultation.

Reflection: The specific claim is falsifiable (no skills were not observed) with future studies needed, particularly on student outcomes. For now, the claim is tenable, and the study can be replicated.	**Reflection**: The general claim (for a theory) is a stretch in generalizing from the evidence to a theory of consultation, particularly a *behavioral approach*. Furthermore, it is not falsifiable.

Summary. In the end, Tindal and Taylor-Pendergast (1989) found most consulting was not interactive but reflected all the other activities that supported the interactions. For example, consultants spent time reviewing IEPs and school records, observing classrooms, drafting reports, and making recommendations. In the actual activities of consultants, only 14% of their time was spent with teachers (in their presence, including team meetings) and only 22% of their time was spent (indirectly) communicating interpersonally with others (including parents and students). Note that these two amounts cannot be added. In summary, a deductive approach began with a behavioral perspective that led to the design of a study resulting in findings capable of being disconfirmed. In contrast, an inductive approach, with a sprinkling of observations from the field, could not lead to findings in support of only a behavioral approach (e.g., other approaches could be supported).

Reflections on Arguments

Begin your argument first and then eventually grow structure and style. As you reflect on making an effective argument, consider the following practices and strategies to ensure it is sound. Place your argument close to the front of the paper to structure the story with compelling language. Also anticipate coming back to certain topics: Use phrases and come back to them later by turning them into a heading or turning a heading into a phrase. The next chapter focuses on setting yourself up with structure in your writing that deploys headings, hesitations, stop signs, transitions, and catchphrases, all of which control the flow of your writing and allow you to develop a style that is your persona.

In moving from a *purpose or a claim* (to evidence and warrants), your writing can be loud or soft, specific or general. Hopefully, you have more specific definitions in these components that help begin to structure your paper. As you gather information, your claim may change, so remain flexible. Consider the modal qualifiers in conditioning the specificity or declarative nature of your claim. Although strong claims are easier to disconfirm, they also may lead to a dead end.

Focus on *primary references* and not *secondary* references. For example, a researcher might have quoted an original source and you want to use this original source without accessing it. Well, that's cheating. It assumes that the original source was correctly referenced (in content) by the researcher. Take the time to access the original source and intertwine it with the other reference by the researcher. You are then on track to strengthen your argument and make it much more authoritative. If you must use a secondary reference, note that with the phrase "as cited by."

Arguments need to be supported by *evidence* that deploys **reliable** measures and leads to **valid** conclusions (Galvan & Galvan, 2017). As you sweep through your tables, develop a story that focuses on these variables. For example, *reliability* can be considered as internal consistency or inter judge agreement, which is important when judgments are made. On the other hand, it may be stability over time. *Validity* is important but remember that it refers to inferences of the decision making. It is not whether a measure is valid or not, instead, it is whether the decision or inference made from that instrument is valid. Pan (2016) also refers to both concepts (reliability and validity) but also adds quality control and causality inferences.

The argument structure should help you see the *forest for the trees*, paying attention to the sample, the methodology (quantitative, qualitative, mixed methods), the measures, and all the other components from your table referenced in the last chapter). These variables may be strewn about the various components of your argument (be a part of your claim, your evidence, warrants, backing, qualifiers, and counter arguments). It is likely that you choose to not apply all studies in your table, but at least organize your argument to reflect the *patterns* across the studies, as you move from summarizing to synthesizing, pulling out those patterns of what is, what is not, and what might be.

Galvin and Galvin (2017) also address *research design,* which relates to how resources are allocated. Is it to everybody? Is it to one group first and then another group? Is it to half the group randomly assigned? Thus, think about the resources that people get and how they are getting them.

Consider statistics (both descriptive and statistical significance), as well as effect size. Descriptive statistics can be informative on the samples being studied or the measures being used. Attend to column titles in published research and draw from a variety of resources. Avoid getting stuck on heavy statistics that are used in articles but use them as either evidence directly in support of your claim or in support of your warrants.

Though it is difficult to meld the components of your argument together when you are in beginning stages, think of the nuances that can lead the argument along. Use the argument to connect the separate pieces and emphasize relations. Realize that the argument may be nascent and not necessarily written using Toulmin's terms. But your argument needs to have clean, clear demarcations with explicit foundations.

Your argument should provide a *road map* that allows you to go back and forth. In writing, the process is often iterative. Consider going back to the trailhead of your argument and thread it through all the components, putting them together like a *jigsaw puzzle*. At some point, though, you need to put the pieces together, reflecting more art than science. Nevertheless, it is easier to stuff the mush into the structure than it is to pull the structure out of the mush.

As you finalize your argument, your paper needs to address *structure, headings,* and *transition devices* (Chapter 5). Begin attending to the art of writing by prioritizing and sorting words and terms. Consider some of them as pivotal and structural. Be judicious in the words used in in the structure and headings. Consider transition devices used in your argument. Eventually, your goal is to convince the reader about the soundness of your argument, so that you can move on to the method section.

In summary, this chapter was about claims, evidence, warrants, backings, and qualifiers. Lurking inside that writing is an introductory paragraph that should be a clear statement of what you are proposing. The argument can become the second paragraph that then addresses your search process. It is a fully framed paragraph that introduces your literature review and appears within the first few pages of your synthesis; it leads into your search process. After reading the first few pages, readers might be intrigued to ask questions such as: Do you have evidence that is presented later in the paper? Is that evidence accurate? Are your references authoritative? Do the methodologies of the studies provide the warrants that connect the claims and the evidence?

Appendix A – Fallacious Assumptions and Conclusions

Appendix B – Write Right Now Prompt, Concepts/Vocabulary, and Response

Appendix C – Assignment 4

Appendix D – Assignment 4 Review Guide

Book References

Barnet, S., Bedau, H., & O'Hara, J. (2020). *From critical thinking to argument: A portable guide*. New York: Bedford/St. Martin's.

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Appendix A – Fallacious Assumptions and Conclusions

The most fallacious claim to sweep over the American public was vote stealing presented by then President Donald Trump that began in the summer of 2020 and simply ramped up to become a mantra by November 2020. In covering this event, the British Broadcast Company (BBC) wrote about its origin and subsequent roll out via various claims (https://www.bbc.com/news/blogs-trending-55009950). In this media link, entitled *'Stop the steal': The deep roots of Trump's 'voter fraud' strategy*, author Marianna Spring, specialist disinformation reporter, describes several significant events.

The Anti-Disinformation Unit in the BBC revealed that influential accounts contributed to disinformation, particularly Trump himself and then other right-wing accounts. "But this time around, the evidence suggests many more people have been seeing unsubstantiated claims all over their social media feeds for weeks." On election night, videos of voter fraud went viral. The slogan, *Stop the Steal* moved from Twitter to Facebook. The BBC investigated dozens of voter fraud claims and found them to be either untrue or impossible to prove, including pens being distributed that would invalidate the vote, dead people voting, and eventually several conspiracy theories (including QAnon) leading to claims of fraud. The voter fraud 'argument' generally rested on claims that represented hasty generalizations and reference to authority (Trump). Finally, in many states, a more disciplined court (not of public opinion but with legal authority) was invoked: A Reuter news feed noted that "state and federal judges dismissed more than 50 lawsuits presented by then President Donald Trump and his allies challenging the election or its outcome" (https://www.reuters.com/article/uk-factcheck-courts-election/fact-check-courts-have-dismissed-multiple-lawsuits-of-alleged-electoral-fraud-presented-by-trump-campaign-idUSKBN2AF1G1).

A good argument needs to not only include a claim also but evidence to support it, as well as warrant(s) that can bridge the claim with the evidence. Beyond the lack of evidence, a few warrants are missing in the 'voter fraud' claim such as reference to each state's policies on remote voting, previous base rates of voting in each state, the difference in vote counts that would indeed be too close and a recount needed and completed, opportunity for conducting the type of fraud suggested, etc. Beyond these basics of an argument, other sources to back the claim should be provided, anticipatory rebuttals could be invoked, and different qualifiers may be advanced.

A base feature of WriteRightNow is the opportunity to link any media along with the problem prompt, including video feeds, PDFs, internet links, and any number of support documents to structure the writing process. This feature comes with a caveat, however: As writing becomes more integrated across various media, "the medium is the message" (see Marshall McLuhan). *Facebook* is a classic example of this, particularly as a newsworthy 'reporting' outlet.

Moral of this blog: The medium is the message has turned from radio to television and now to social media. These media present both opportunities and obligations for disciplined dialogue.

Appendix B – Write Right Now Prompt, Concepts/Vocabulary, and Response

Prompt

Highlight the gist of your argument. Use Toulmin's framework to explicate your claim, warrants, and evidence. Consider delimiters, qualifiers, and potential rebuttals.

Use any/some of the following concepts (underlined phrase below) and the vocabulary words within them.

Concepts/Vocabulary

Logic: claim, grounds, evidence, warrant, backing, rebuttals, qualifiers, necessary, probable, plausible, possible, always, sometimes, quantity, quality

Response

Claim: States now include students with significant disabilities in large scale state accountability systems. It is difficult, however, to determine whether improvements are occurring for this population. Nevertheless, it is possible to scale improvement in a sensitive manner as long as 'within proficiency' category performance is properly addressed.

Grounds or Evidence: Several behavioral count data show consistent (longitudinal) changes over time across two grades and two subject areas.

Warrant 1: Serious measurement problems are present in testing this group of students.

Warrant 2: Measurement of improvement requires vertical scales.

Warrant 3: Current models using transition matrices are inadequate.

Backing: Improvement over time exists for students in general education.

One rebuttal involves the opt out rates in a state.

Some qualifiers involve the technical adequacy of state tests, the use of accommodations, and the definition/operationalization of achievement standards.

Appendix C – Assignment 4

Develop your argument building off the table and outline to develop an opening introductory paragraph. Address issues of diversity, equity, and inclusion as appropriate.

Tindal, Irvin, Nese, and Slater (2015) used two elements to frame the focus of a study on the skills needed for children entering kindergarten: acquisition and participation …Empirical literature is then summarized to focus the methods and outcomes…

Their argument was based on the need for a more expansive view of assessment to include not only skill development but also two types of participatory skills (self-regulation) considered particularly important in young children. In collecting data on over 1,200 individuals, they documented a causal model in which participation facilitated growth in academic skills.

Summary of Claim • Grounds (evidence) • Warrants

Claim: Much of the research on early literacy and numeracy has focused on learning skills not on learning to participate in (a) compliance with teachers' tasks (mands) and (b) in coordination with other learners.

Grounds or Empirical Evidence including causal model of influence

- Participation in social skills and engagement
- Academic skills of early mathematics and reading
- Previous studies: ECLS-K research

Conceptual Warrants/Assumptions (connecting the claim with the evidence)

Sample to populations, symptoms-problems, cause-effect, expertise, principled values

- Sfard's article on *Two Metaphors for Learning* as acquisition and participation can be used to provide an impetus for the study on the kindergarten 'Readiness' Assessment (Sfard, 1998).
- It is difficult to learn without also participating. A body of research exists on self-regulation. Yet, prior research has focused mostly on acquisition.

Backing (supports and extends the warrant)
Rebuttals are possible, particularly in the direction of the causal model.
Qualifiers may be needed to limit the research on self-regulation: (a) participation may be particularly important for under-represented groups and (b) a need exists for large scale adoption.

Assignment References

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Appendix D – Assignment 4 Review Guide

Develop your argument building off the table and outline to develop an opening introductory paragraph. Address issues of diversity, equity, and inclusion as appropriate.

Note 1: You do not have to be explicit in labeling the parts of your argument (claim, evidence, warrants, backing, rebuttals, and qualifiers).

Note 2: The following bulleted list is only suggestive, and all questions do not need to be addressed.

Is the main claim clear (claims of fact • value • policy • concept • interpretation)?

Is the claim on point • precise • significant?

Is evidence suggested (to be presented later in the paper)?

Is the evidence: accurate • precise • authoritative • representative • current • relevant?

Do warrants connect the claim and evidence (are they suggestive to appear later in the paper)?

Are warrants embedded widely regarded as valued among the author's audience?

Does the logic behind the warrant(s) clearly apply to both the claim and the evidence?

What backing (if necessary) is also provided to support the warrant?

Are qualifiers (if necessary) used to delimit the argument?

Are rebuttals (if necessary) acknowledged/presented?

Can this paragraph open the entire literature synthesis (have enough reach to extend until the Method Section)?

Does the paragraph read well and make a cogent introduction?

Does the paragraph end with a smooth transition to the next paragraph (which is the literature search)?

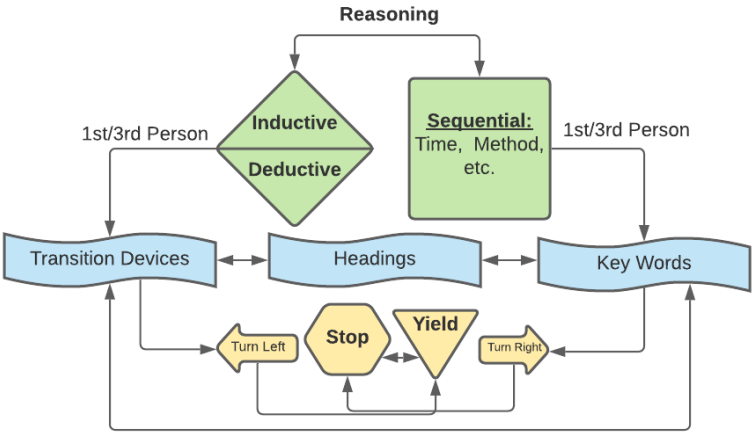
Chapter 5

Developing Structure and Flow: Reasoning, Headings, and Transition Devices

BRT

behavioral research & teaching

The focus of this chapter is on structuring the literature synthesis using explicit techniques that weave references and terminology into a convincing argument. To get to this argument, however, a structure must be present using both a shape in your reasoning and headings to support this structure as well as your referential logic. In addition, transition devices (key terms and linking words) inherently need to be woven throughout the text. Finally, the literature synthesis must end with a systematic transition to a conclusion that sets up a method section that anticipates a discussion section. Controlling the flow of the paper is no easy task but can be created stylistically using concise argumentation and strong writing. The structure needs to thread a needle across different studies. The best way to provide structure is through headings, reasoning, referential logic, and transitional devices. The literature synthesis is traversing published studies on a certain topic that vary in their focus, from empirical to conceptual theoretical. Between these various (re)sources, terms acquire meaning, findings acquire contexts, and the argument acquires movement (from evidence to claims through warrants). In the end, by addressing reasoning, person, headings, transition devices (both key terms and linking words), your writing can become more colorful and begin to tell a story: your story. This is where the fun begins because now, you are putting your color palette of words, to use and bringing the reader along.



Appendix A – The Structure of Writing: Shapes Control the Flow of Traffic

McLuhan stated that the definition of reading is to guess. In a complementary fashion, writing is about anticipation. Reading and writing is a guessing game, and a good tip is to always write with a purpose in mind, which lands on the methods section and discussion. McLuhan also said: "I may be wrong, but I'm never in doubt." To create the most authoritative perspective and lead the readers' guessing to a successful resolution, it is important to be being specific but without being boring. Your paragraphs need to display a range of specific examples from previous research indicating consistencies and gaps. As the structure takes shape, you are leading the reader to a methodological plan for collecting data, sharing outcomes, and explaining them to extend what we know about a field. The twist, however, is to be specific while staying creative.

In this next section, these approaches have been grouped into (a) a reasoning approach (inductive or deductive), or (b) a sequential approach. Both should lead to conclusive judgments. Writers can mix and match accordingly but a conclusion needs to be present.

Structure through Reasoning

It's likely that your search has uncovered considerable literature about the phenomenon being studied. This literature may be empirical or conceptual/theoretical. These two types of approaches can appear either from *narrow to broad (deductive) or broad to narrow (inductive)*. Use the differences in these reference types to create a structure. Empirical references can be used to create commonalities and gaps among specific findings. After covering them, these comparisons can be wrapped into a more conceptual/theoretical summary that ties them together. Non-empirical publications can provide a potential structure in logic to frame and synthesize the literature. In contrast, if your study is theory-driven, use this to frame the synthesis that provides the boundaries within which more specific findings can be presented. In these two examples, the former presents an *inverted funnel*, where you move from specific studies with (in)consistencies that might lead to a theory, going from *models to variables*. The latter presents a *funnel* technique. that starts from a theory and then moves to specific information, *predicting* certain commonalities that may be important and why. Note a word of caution: Theories apply to and from *samples* to *populations*. Researchers do not study populations. So, an important feature, whether using an *inverted funnel* or *funnel*, is to carefully consider generalizability: of samples but also of measurement and outcomes.

In a *sequential approach*, the structure of your writing can follow a specific route that presents a logical sequence as presented in Table 1. And note that can you move *horizontally* or *vertically* across Table 1. For example, a cause may be pertinent only when certain conditions prevail. Or a cause may result in several effects, which in turn may need to be prioritized. Examples can provide both support for or against a claim and may reflect different emphases. These different stylistic devices can also be used vertically to structure your writing. Obviously, causes can lead to effects, which can in turn be concatenated into examples that provide support for or support against a claim (or warrants). They also provide a structure within paragraphs or between them.

Table 1

Sequential Reasoning to Structure Writing

Cause / Condition / Purpose	Look for putative explanations paying particular attention to study designs.
Effect / Consequence / Result	Look for confounding influences that warrant the findings.
Examples / Support / Emphasis	Look for clusters of studies using the same theoretical paradigm.
Conclusion / Summary / Restatement	Conclude, summarize, or restate ideas, or indicate a final general statement.

Note: From Tindal, Nolet, and Blake (1992).

Sequential Reasoning through Voice and (Implicit) Pronoun Perspectives

As you locate journals and authors, consider voice as a component of structure that may become important in your writing. We define voice in terms of the pronoun (singular and plural) in the subject of the sentence: (a) first person (I/we), and (b) third person (she and they). As we noted

in Chapter 2, recent editions of APA style (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014) encourage writing in the first person. So, instead of writing "this researcher has planned the following study…." It would be much better (and clearer) to write "I have planned the following study…." But be careful: Too much of a good thing can turn against you and your writing can draw attention to you, instead of your story.

Your literature needs to balance your persona and the literature. By the very nature of using referenced literature, you inherently acknowledge this balance by invoking specific references in either of two ways. You can make statements that end with a reference that places the authors and dates entirely within parenthesis, representing a **first-person** pronoun. For example, "Oral reading fluency is highly correlated with comprehension (Tindal, 2013)." In this sentence, you are claiming the finding but leaning on research conducted by others (e.g., Tindal, 2013). Now, the decision is primarily about how much detail to include in this statement so that it appropriately attributes the finding without too much reach (and thus overclaims the author).

Note that this form of first-person perspective can also lean on too many references and overclaim their individual differences. For example, the following statement would represent the use of *bunched* references (which are fictitious): "Oral reading fluency is highly correlated with comprehension (Glasgow, 1999; Alonzo, 2020; Nese & Alonzo, 2019; Tindal & Alonzo, 2015). This statement overclaims the correlation and misses important differences among the studies (e.g., treating them as if they have the same samples, measures, etc.). This can be corrected in your favor, by acknowledging important differences among the authors, which also presents you as more knowledgeable. It would be advantageous to *distribute* the references and provide more specificity: Oral reading fluency is highly correlated with comprehension, whether the criterion measure is the Gray Oral Reading Test (Glasgow, 1999), other curriculum-based measures like DIBELS® and AimsWeb® (Alonzo, 2020), the Test of Reading (Nese & Alonzo, 2019) or state tests (Tindal & Alonzo, 2015).

The structure of your synthesis can also shift from first person to the **third person**: The author(s) is/are used in the sentence and only the date is parenthetical. For example, you could write: "Tindal and Alonzo (2015) documented that oral reading fluency is correlated with comprehension on state reading tests". Or you could write "Glasgow (1999) reported that oral reading fluency is highly correlated with the Gray Oral Reading Test. Also note that APA style requires using 'and' between authors when they are referenced in a sentence outside the parenthetical date.

Using third person references requires attention to the verbs for reporting specific information. It is likely that you will need to vary these verbs as well as use various transition devices. For example, using the references above, the following might be written (with the verb and transition underlined): Glasgow (1999) reported high correlations between oral reading fluency and comprehension with the Gray Oral Reading Test. In a similar manner, Alonzo (2020) documented high correlations with curriculum-based measures (e.g., DIBELS® and AimsWeb®). Finally, both Nese and Alonzo (2019) as well as Tindal and Alonzo (2015) documented these same high correlations between oral reading fluency and the Test of Reading and state tests,

respectively. Note the strain on the reader using the separation between the measures that relies on ‘respectively’ in the last statement. This style makes more demand for the reader and should be used sparingly. As noted earlier, refer to (Tindal, 2013) for the real history of oral reading fluency research as these references are fictitious.

This type of structure is more subtle than either headings or approaches to reasoning. Either approach, first and/or third person, may work well but it needs to be used effectively. For example, your paper may lead with your own perspectives (first person) and then move to support from others more directly (third person). On the other hand, the opposite may provide you an effective shift from what other researchers are finding (third person) that leads you to adopt specific and complementary perspectives (first person) of your own. Finally, the two approaches may be interspersed within a section (header) of your synthesis.

Headings Control Structure (via APA Style Guide)

Headings are useful when it comes to scientific writing because they break up the complexity and help the readers stay engaged. They prepare the reader in advance and organize the information inside that section. They prepare the reader for a coherent chunk of information that can also be value add or reflect any number of intellectual operations (e.g., predictive, explanatory, illustrative, etc.). A good rule of thumb about headings is that someone who is not familiar with your writing can go through them and see an overview of your argument. Headings need to tell a story; they cannot be simple and vague single words. Good headings highlight an angle for the claim, the warrants, the evidence, all of them pointing to the argument that you are making without using stuffy language. Avoid too few words in headings or having unnecessarily long headings that stretch across the page into paragraphs. Headings should fit on one line and be stylistically rich; they should highlight and complement your reasoning approach and structure the content in a natural manner that highlights the deductive/inductive or sequential logic.

A total of five levels are possible in APA Style headings, including the main section (Level 1) followed by the subsection (Level 2), etc. Level 1 for empirical publication headings are Introduction, Method, Results, and Discussion. The beginning of a paper does not need a heading, as the introduction paragraph plays the same role. Headings are recognizable by being separated and bold, so that they stand out and are easily understood.

Table 2

APA Style Headings

Level	Format	Example
1	**Centered, Bold, Title Case Heading** Text begins as a new paragraph	**Results**
2	**Flush Left, Bold, Title Case Heading** Text begins as a new paragraph	**Spatial Ability**
3	***Flush Left, Bold Italic, Title Case Heading*** Text begins as a new paragraph	***Test one***
4	**Indented, Bold, Title Case Heading, Ends with a period.** Text begins on the same line and continues as a regular paragraph.	**Teachers in Training.**
5	***Indented, Bold Italic, Title Case Heading, Ends with a period.*** Text begins on the same line and continues as a regular paragraph.	***Teaching Assistants.***

Note: From American Educational Research Association et al. (2014, pages 47-48).

As APA manuals undergo revisions and changes, be sure to stay current in your search for examples and templates. Three writing resources are available for accessing either style guides or templates for headings. A few useful tips and tricks can be found in Purdue Owl writing lab: APA Headings examples, as well as great template tools with clear writing examples and feedback. Finally, a video tutorial from Eastern University offers a free word template and includes a video tutorial for APA headings.

Pivot Structure with Transitional Phrases (Key Terms and Linking Words)

All three devices control the rhythm and flow of your writing. They punctuate the cadence and provide the reader respite to muse, confirmation to continue, extensions to consider, and potential for extending ideas, particularly within sectional headers.

Key Terms. The important function for using key terms is to add relief. For example, inequities and inequalities provide a twist of a word, suddenly shifting to a different word: Not being equal is different than not being equitable. Be careful and specific with such terms, and when using them, highlight your specific example. Many words can be classified as both nouns and verbs, providing you a natural segue to stretch the meaning. In other instances, authors have defined key terms in different ways; take advantage of this. Key terms and transition devices allow flexibility and access for iterative writing. Start using them early in your paper, so the overall flow of the paper is coherent and no one part sticks out. Key terms and transitions can be useful in supplying more general or more local pivots that guide the direction of the reader. An important caveat to these structural components of an argument is their implementation concurrent with transitional devices. Although these reasoning devices and personal perspectives center your argument(s), key terms and transitional devices embellish and enhance them, making your argument more apparent as well as elegant.

Transitional Phrases. When we read content that showcases solid factual data, provides support, and yields interesting results, we may still feel like something missing. This something (transitional words) is what differentiates skillful writing from just writing. Transitional phrases are not fillers to add, they provide structure and organization to your paper and make it easy to follow a substantial chunk of scientific writing. Without them, the evidence, and the connections the author is trying to make can seem abrupt or even unrelated, which in turn, is detrimental to your argumentation and persuasion. Some literature may represent a time sequence and transition words can emphasize this chronology (earlier and later, etc.). Or consider other relations regarding the order/position (e.g., first, second, third, etc.), emphasis (e.g., primary, and secondary), or place (e.g., regional, or geographic). These transition words aim to connect these directional words to the content through illustrations, quotes, findings, etc. Barnet, Bedau, and O'Hara (2020) provide examples for using these directional forms to shape your writing; invoke them with specific transitional phrases. The following provide illustrations.

Illustration…for example, for instance…

Sequential…first, second…

Logical…as a result, therefore…

Amplification…furthermore, in addition…

Compare…similarly, in like manner…

Contrast…However, in contrast…

Summarize…In conclusion, briefly…

Concession…To be sure, granted…

Linking Words (Possel, 2013). This source is a compilation of linking words such as eventually, whereas, as can be seen, etc. The document has two sections: transition phrases/words, and conjunctions. Transitional words are sorted by seven categories including agreement, emphasis, contradiction, condition, sequence, location, and summary. Conjunctions are broken into three parts, compiled of subordinating, correlative, and coordinating. This cheat sheet also has a fun trick to remember the most used conjunctions: FANBOYS, which translates to "For, And, Nor, But, Or, Yet, So."

Purdue Writing Lab – Transitional Devices (Purdue University, undated). If you have ever encountered references to APA-style writing, you are likely acquainted with the Purdue Owl Writing Lab, one of the pioneers in guiding students in APA writing manner. One of the key pieces to a coherent paper is transitional devices. They help carry one thought onto the next thought, creating a bridge for ideas you plan to introduce in your writing. This resource provides examples of words and phrases that can be used to add, compare, prove, show exception, reflect time, repeat, emphasize, display sequence, give examples, and conclude.

University of North Carolina – The Writing Center (Center, Undated). The Writing Center at the University of North Carolina provides several types of transitions, structured to highlight separation between sections and paragraphs or transitions within paragraphs.

Transitional Words and Phrases – Writer's Web (Taraba, Undated). Unlike the other guides that provide transitional vocabulary, the University of Richmond's writer's web gives an explicit example of how to integrate transition into your sentences. It also includes devices that help writers illustrate, add content, provide details, and make examples and suggestions.

Writing with Clarity and Style (Harris, 2003). This resource is an in-depth analysis of transition words and phrases with clear examples, self exercises, word banks, and little quizzes to help writers excel in their academic writing. Besides transitions, this analysis also includes chapters on clarity and figurative language, again with word banks and exercises for practice purposes.

Appendix A – The Structure of Writing: Shapes Control the Flow of Traffic

Appendix B – WriteRightNow with Prompt, Concepts/Vocabulary, and Response

Appendix C– Assignment 5

Appendix D – Assignment 5 Review Guide

Book References

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing* (7th ed.). Washington, DC: American Educational Research Association.

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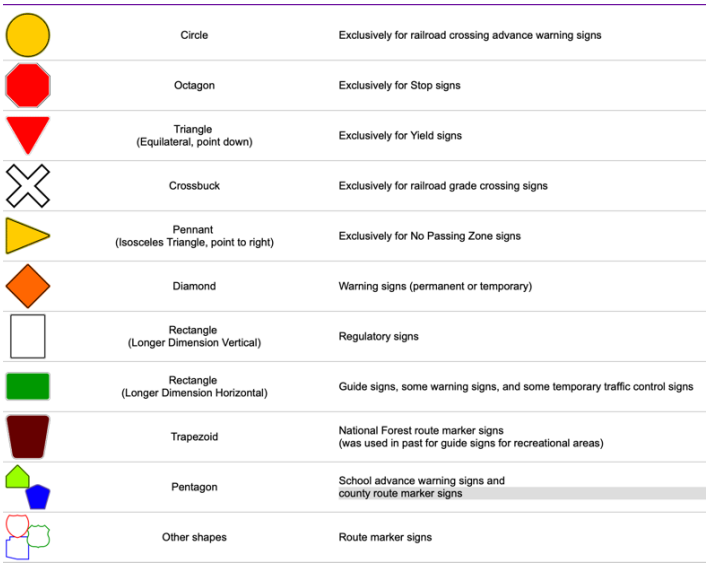
Appendix A – The Structure of Writing: Shapes Control the Flow of Traffic

"Signs convey information to travelers not only by their messages and color, but through their shape as well. Special shapes are specifically assigned to certain types of signs so that travelers can recognize them quickly and react appropriately. In general, the greater number of sides on a sign, the more critical a message it conveys" (http://www.trafficsign.us/signshape.html).[1]



Circle	Exclusively for railroad crossing advance warning signs
Octagon	Exclusively for Stop signs
Triangle (Equilateral, point down)	Exclusively for Yield signs
Crossbuck	Exclusively for railroad grade crossing signs
Pennant (Isosceles Triangle, point to right)	Exclusively for No Passing Zone signs
Diamond	Warning signs (permanent or temporary)
Rectangle (Longer Dimension Vertical)	Regulatory signs
Rectangle (Longer Dimension Horizontal)	Guide signs, some warning signs, and some temporary traffic control signs
Trapezoid	National Forest route marker signs (was used in past for guide signs for recreational areas)
Pentagon	School advance warning signs and county route marker signs
Other shapes	Route marker signs

In the traffic signs to the right, safety is regulated so that drivers can anticipate the road ahead. Likewise, flow of writing for a literature synthesis is controlled by the shape of the discourse, which can be manipulated by three variables: (a) meta structure (shape), (b) headings, and (c) transition devices. Their influences are increasingly more specific moving through these devices.

At the macro level, **shape** can be considered as a funnel (moving from broad to specific) or inverted funnel (specific to broad). The shape can also be chronological, beginning with the earliest and ending with the most recent references. The shape of a literature synthesis may also be methodological, in which similarities and differences are highlighted in the manner that previous research has been conducted. A feature of WRN is the use of supplemental materials that can be distributed to guide the writing process, using advance organizers or links to important websites. Shapes are operationalized in a slightly more specific manner using graphic organizers. For example, in Training Module 3[2] (pages 35-43), several structural devices (graphic organizers) are used to control the flow of information, which can then be used to articulate headings (in various nested levels. The **heading** structure of APA Guidelines is more than a list of style guides for capitalizing and indenting; rather, they control the logic of an argument, with outermost levels serving as primary warrants that are further articulated with nested headings. And if the language is sufficiently detailed, headings can serve as shorthand for speed reading the content and relations among topics. Finally, shape is enhanced by strategic use of **transition** devices within and across paragraphs. Given the primary genre of thesis and dissertation writing is argumentative, several obvious transition devices are available, which are addressed in another Blog on Box Car Writing.

Moral of this blog: Writing can be controlled in three ways that work together: (a) overall structure that provides shape (which can be planned and then simply invoked), (b) headings that provide obvious visual structures much like road signs, and (c) transition devices that deploy specific words for pivot and pirouette.

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[1]

[2] Tindal, G., Nolet, V., & Blake, G. (1992). *Training Module 3: Focus on teaching and learning in content areas*. Eugene, OR: University of Oregon: Behavioral Research and Teaching.

Appendix B – Prompt, Concepts/Vocabulary, Response

Prompt

Highlight the structure and transition devices: Note how they allow you to take the reader across content (topics). Integrate them in shorthand with your arguments.

Use any/some of the following concepts (underlined phrase below) and the vocabulary words within them.

Concepts/Vocabulary

Structure: chronology, development, building blocks, methodology, pyramid, inverted pyramid, funnel, inverted funnel, graphic organizers, dates, authors, compare, contrast, sequence, reasoning, headings, levels

Transitions: between sections, between paragraphs, within paragraphs, similarity, exception, contrast, sequence, order, time, example, emphasis, place, position, cause, effect, support, conclusion, summary

Response

In this paper, I plan to use four structures with transitions:

The opening section introduces a broad policy context for situating the problem and uses a chronology of political action on school accountability that then moves to the development of sanctions introduced by NCLB.

In the second section, I plan to use a funnel technique, to introduce empirical research (because of the chronology above) on the use of transition matrices for individuals taking alternate assessments. I also highlight methodological issues in this section.

Within this section, I have a subsection where I use a compare and contrast structure across two paragraphs (a paragraph for each of two studies) that investigated transition matrices for school effects with general education assessments.

I then loop back with a summary (inverted funnel).

Appendix C – Assignment 5

Create structure and flow through reasoning, headings, and transition devices to develop a draft of your synthesis.

Note: I am using the publication by Tindal, Nese, and Stevens (2017) for this plan.

Policy context and Legislative Mandates

NCLB…first

ESSA…. second

Methodological Difficulties

Population characteristics…. early, later, subsequent…studies

Measurement problems…not only, additional, consequential

Previous Empirical Research

Two studies are presented, highlighting their respective methodological procedures for converting transition matrices into 'improvement' on state tests and the subsequent outcomes.

Study one is (Hill, 2006): In this study….(may be two paragraphs for methods and outcomes).

Study two is (Schafer et al., 2012): In this this study….(may be two paragraphs for methods and outcomes).

Assignment References

Hill, R. (2006). *Using value tables for a school-level accountability system*. Paper presented at the National Council on Measurement in Education (NCME) Annual Conference San Francisco, CA.

Schafer, W. D., Lissitz, R. W., Zhu, X., Zhang, Y., Hou, X., & Li, Y. (2012). Evaluating teachers and schools using student growth models. . *Practical Assessment, Research, & Evaluation, 17*(17), 1–21.

Tindal, G., Nese, J. F. T., & Stevens, J. (2017). Estimating school effects with a state testing program using transition matrices. *Educational Assessment, 22*(3), 189-204.

Appendix D – Assignment 5 Review Guide

Create structure and flow through reasoning, headings, and transition devices to develop a draft of your synthesis.

Is the set up (introductory paragraph) appropriate for the literature that follows?

Is it clear what gaps or underlaps exist from the main argument (claim-warrant-evidence)?

Are the headings nested in a way that fulfills the organizing paragraph above?

Does the literature synthesis flow logically across topics (headings)?

Does the literature synthesis flow logically within topics (headings)?

Does the literature synthesis have an overall shape?

Are terms appropriately defined (with reference)?

Is appropriate attention provided to references in a comparative manner (e.g., by reference to methodological variables or findings)?

Are references used appropriately?

Does the synthesis tell a story?

Are appropriate transitions used in line with the headings?

Appendix E – Two Types of Transition Devices[3]

Reasoning Approach (Deductive/Inductive) Transition Devices

Cause / Condition / Purpose	These transitional phrases present specific conditions or intentions.
Effect / Consequence / Result	Some of these transition words (thus, then, accordingly, consequently, therefore, henceforth) are time words that are used to show that after a particular time there was a consequence or an effect.
Examples / Support / Emphasis	These transitional devices (like especially) are used to introduce examples as support, to indicate importance or as an illustration so that an idea is cued to the reader.

Tabled Approach Transition Devices

Agreement / Addition / Similarity	The transition words like also, in addition, and, likewise, add information, reinforce ideas, and express agreement with preceding material.
Opposition / Limitation / Contradiction	Transition phrases like but, rather, and or, express that there is evidence to the contrary or point out alternatives, and thus introduce a change the line of reasoning (contrast).
Time / Chronology / Sequence	These transitional words (like finally) have the function of limiting, restricting, and defining time. They can be used either alone or as part of adverbial expressions.
Space / Location / Place	These transition words are often used as part of adverbial expressions and have the function to restrict, limit or qualify space. Quite a few of these are also found in the time category and can be used to describe spatial order or spatial reference.

[3] Adapted from Tindal, G., Nolet, V., & Blake, G. (1992). *Training Module 3: Focus on teaching and learning in content areas*. Eugene, OR: University of Oregon: Behavioral Research and Teaching.

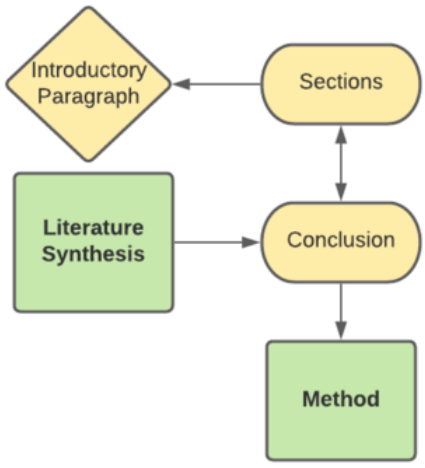
Chapter 6

Clear Beginning, Strong Writing, and Conclusive Ending

BRT

behavioral research & teaching

Now is the time to start drafting a paper that looks like a paper. It reads like a paper, it has the storyline, the argument, all the headings, and transitions. This chapter is about writing with strength that sweeps through the structures, headings, and transitions from your previous draft to finesse a near-final draft. The focus of the chapter now shifts to the whole, integrating the parts and providing a runway for successive sections and paragraphs, as well as specific language, and most importantly an introduction and conclusion. Your paper needs to grow balance in presentation, so all parts have an equal say and fit. Furthermore, the sections (headings) need to be logical and roll out in a convincing manner. In this process, both ends of the paper need to be crafted so that the end is anticipated from the beginning. Furthermore, this ending needs to land in a manner that passes off the logic from a referred argument to a method section that addresses the next step of research in your area. All the while, the writing needs to be direct and active, reflecting clarity.



This chapter is designed to result in four outcomes: (a) refine your writing between and within sections and paragraphs, (b) use specific language, (c) result in a main introductory paragraph (advance organizer) that is to be placed after the description of your search process and main argument, and (d) present a summary of your main ideas and argument that can be used as an advance organizer to your method section. The diagram presents the main sections of your paper (green) and the complementary paragraphs (yellow) that reflect your refinements.

Appendix A – Direct and Active Writing: Strength in Clarity

As Morley (2021) notes along with every author on writing, the writing process is iterative. "Writing at the academic level is not something we can do once and then leave. It is a recursive process. This means writers return to their initial texts, revising and redrafting them. This process is ongoing. In fact, many writers find it difficult to stop improving their writing, but with time being limited, they try to do as much as they can before the onset of a particular deadline." (Morley, 2021, p.148) This chapter, therefore, is about refining your literature synthesis, given the content that frames your argument and the structure that conveys not just your content but also the format deployed in delivering it. Now is the time when perfect is not the enemy of good: Perfect is what you want. Perfect is also APA compliant.

Currently, your paper has structural posts with an introductory section, including headings and transitions. Now is the time to look for balance: For example, consider the number of headings versus the number of pages. Do you have one header for every three pages and then one header that is only two paragraphs? Think about symmetry and parallelism. Do you use one header per warrant, or do you group them? Look at your headings as a form of outlining: Do you use two, three, or four levels? Check the levels of headings: If you have only one (sub)heading, you need to add another or integrate it within the superordinate heading. Bottom line: Every heading must have a pair. Be careful across sections being consistently long.

Note that in typical state assessments (and according to the National Writing Project), analytical traits are used to document performance and proficiency. What is interesting is that previous research on the 'independence' of these traits, also supports the importance of 'conventions' which accounts for a considerable amount of the variance in writing assessments. For example, eWrite showed two dimensions: "The first consists of the '*Orientation and engagement*,' the '*Text structure*' and the '*Ideas*' criterion, which in the *eWrite* marking rubric fall under the overall heading of the "Purpose and Audience" criteria. These can be thought of as the content criteria group. The second specific factor consists of the '*Sentences*,' the '*Sentence punctuation*,' the '*Punctuation within sentences*' and the '*Spelling*' criterion, which in the *eWrite* marking rubric fall under the overall heading of the "Conventions" criteria. These can be thought of as the language convention criteria group" (Urbach, 2014, p. 1110). In the end, perfect use of conventions is critical to supporting a coherent synthesis.

Between Sections and Paragraphs

Strong writing has several features **between** sections and paragraphs. An introductory paragraph of a section needs to provide foreshadowing and serve to organize the points of argumentation, providing a clear road map of where you are heading. Ideally, it presents a great hook and previews the form: pyramid (expanding), inverted pyramid (narrowing), sequential (compare contrast), through the subheadings, which navigate the landscape in a structured way. However, avoid just putting neutral headings: Headings should make a statement and provide a point of view. This is where the inventiveness of writing comes in ideally, it is logical from one point to the next. Use structural and transitional phrases that present emphasis and carry a story that goes beyond just facts but puts a context around those findings. Juice up your headings to convey not just nuances but attitude. For example, you might want to anticipate a heading dealing with definitions or variables to be considered. Avoid leaving headings hang out from the sequence of text: Make them central to the text that appears before and after. You may use headings a bit more judiciously to reflect the text within the section. Ensure consistency in the headings and project a point of view. Finally, consider the use of figures or tables to break up the rhythm of reading, but remember to follow APA guidelines when presenting them.

Table 1

Possible Transitional Phrases Across Paragraphs

Transitional phrases to begin a sentence
If we now turn to...
Further analysis shows that...
Further statistical tests revealed...
Further analysis of the data reveals …
A comparison of the two results reveals...
Turning now to the experimental evidence on...
Comparing the two results, it can be seen that...
The next section of the survey was concerned with...
In the final part of the survey, respondents were asked...

Note: From Morley (2021, p.57).

As you drive to the end, know that you have limited time and pages. Therefore, try to make your document tell a story within 20 to 25 pages. Certainly, do not make it 40+ pages which can begin to stretch it. In fact, publications submitted for peer review journals typically have a maxim of 35 pages. And that includes the methods section and results. Your paper is much briefer, 1-2 pages of methods and 1-2 pages of discussion. When you add a title page and an abstract, along with 2-3 pages of references, you suddenly realize that your paper is only about 19 pages.

Within Sections and Paragraphs

Pay attention to the first and the last sentence of every paragraph to ensure they are connected to at least one keyword that connects the paragraphs. Basically, pick one or two keywords and use them as a transition to the next paragraph. Think about it as a sandwich with bread on the outside and the rest in the middle. Often, paragraphs serve as ending of one and foreshadow the next. Be as clear and consistent as possible in the verb tense within the same paragraph.

Move from a general statement to examples from the literature. Also notice that by providing only one example of any idea, your statement is not strengthened but diminished and stipulated. Instead, if you offer examples, offer more than one. And in this process, apply the following principle: (a) to show how two 'things' are the same, use examples that are *maximally* different from each other, and (b) to show how two 'things' are different, use examples that are *minimally* different from each other.

For example, I could highlight the *differences* between informal reading inventories (IRIs) used to capture fluency and formal curriculum-based measures (CBMs). Both measurement systems require students to read text and the teacher tracks their performance. Essentially, they 'look' very similar with *minimum differences*. However, the primary and most important distinction is what is recorded: IRIs track percent of words read correctly and CBMs record number of words read correctly per minute (a definition of fluency). This difference is critical in its sensitivity to reflect variation among students and show change over time. IRIs would be a better contrast for CBMs than more formal published tests, which also differ in many other characteristics: the inherent use of scaled scores, use of normative performance, and standardization of administration and scoring, as well as uses in the public schools.

In contrast, two examples may reflect *maximum differences* and yet represent the same construct. In the world of identification of learning disabilities (LD), two competing models are used: (a) strengths and weaknesses (SW) or (b) response to intervention (RTI). These two systems vary in almost every characteristic: SW focuses on within student differences in perceptual and cognitive processes, while RTI focuses on the success of interventions over time. SW is limited to scaled scores and patterns of high and low scores, while RTI relies on progress over time with fluency-based measures. Finally, SW is usually identified by administering a test or battery of tests from a school psychologist while RTI relies on administration of fluency measures by teachers and instructional assistants. Yet, both are similar in their use for identifying LD.

Strong writing has a voice reflected in the complementarity of references. As noted in an earlier chapter, using many references after a statement is weak; however, by providing one or two

references after a statement, they become more specific. But in citing these statements, take advantage of the differences in these references: their terms, methods, samples, measures, etc. Vary your statements by rephrasing content and occasionally quoting content. This change in pace provides the reader interesting contrasts. It is your job to stay consistent when you glue them together. Get as creative as you wish when using references for different settings, different applications, reference different measures, different arguments. This is the heart and soul of what you are doing, both strengths and weaknesses. Referencing helps to stay consistent, state contradictions, find and define gaps; you want to show the readers everything you found and present it in an interesting way, so really dig in. You can avoid repeating the date if the reference is in the same paragraph; if it comes much later, then add the date back, just for clarity.

Be careful to not overstate your point of view. For example, avoid stating that *no research* has ever been done on a specific subject. Even though the use of tentative language also is to be avoided, overclaims are equally problematic. Here are some examples of expressing caution when explaining the significance of prior studies.

Figure 1

Qualification Phrases

Prior to this	study investigation	X was unknown. it was difficult to … there were no data on … there was uncertainty about whether … it had not been possible to determine … no clear evidence of X had been reported. little was known about the characteristics of … little evidence existed to support the idea that … the influence of X on Y had not been thoroughly investigated.

Note. Variations of qualification phrases (from Morley, 2021, p.77)

Be careful with the use of numbers and think about the measure itself and the degree to which it can change over time or reflect differences among study participants. Many of these strategies become particularly important in the results section, but if you are using numbers in the literature synthesis, the same guidelines apply. Use whole numbers or at least limit your specificity to a single tenths digit. For example, a math test may result in an average of 34.1 digits correctly per minute. Even this example may be overly precise, but at least the reader can make a mental judgment to round to the nearest whole number. For precision, have the reader refer to the numbers in tables. Also note that percentages are hostage to the baseline. For example, if two participants reported an outcome (one positive and one negative), you could note that 50% of the participants were split on their valuation. But that outcome is misleading because only two participants responded. In this case, raw numeric values would be better and more informing.

Avoid use of *there, it, here, this,* or *that* as the main subject of your sentence. For example, there are plenty of differences about… Instead, write, “plenty of differences exist…” or “differences are obvious…” Put the verb closer to the front of the sentence because the verb controls the

sentence. Think like the reader: If I must read a long, complicated sentence and then finally get the verb, then I must reread the sentence to find out where you are going with that thought.

Sentences can be switched to pique an interest in reading. For example, put the more significant statistics at the very beginning: It is better to have them establish the main idea at the front of the sentence. But this rule varies as some writers decide to keep the best for the last. Once you have the direction, it should be simple to use transitional words to add repetitive emphasis in a slightly different manner.

Something to keep in mind: Use the gerund form in a consistent way. Once you have a list of verbs in the form of gerunds, make them all consistent so they can provide a good structural summarizing statement. For example, the following list of gerunds may be used in successive sentences about a researcher who conducted studies by: (a) reducing…(b) complementing…(c) highlighting…and (d) concluding. It would be awkward to suggest that the previous researcher (a) reduced…(b) was complementing…(c) left highlights…and (d) concluded.

Language Specificity

Do not start at the beginning and simply go to the end in your literature synthesis. Start in the middle and go to the beginning to go back to the middle and then go to the end and then go back to the beginning. Your writing needs to be iterative but now is time to ensure a proper handshake with the beginning and the ending of your synthesis that leads to a methods section: You are concurrently setting up the beginning of your literature synthesis (within a paragraph/page) that is (a) anticipatory of the content and (b) lands squarely on the way you address your argument (e.g., the method section).

You are also deciding what kind of sentences and language to use in your paper. Strong and convincing writing is clear and accurate in its use of language. The structure of your sentences can be simple or complex depending on the argument you are making and your audience. In Morley's phrasebook, he explains how using complex sentences can help convey the meaning without being wordy by using "subject --> verb" structure (dependent part --> main part). (Morley, 2021, p.145). Consider placing conditional clauses at the end, though occasionally they may introduce a statement.

Use academic writing because it can help deliver a stronger, more convincing, and authoritative voice. Avoid colloquial uses of words. In this iterative manner, play with words, their repetition, use of exemplars, as well as their density and distribution. Most academic writing focuses on nouns and verbs and much less on adjectives and adverbs to avoid superlatives in reporting the science of methods and findings.

Figure 2

Everyday versus academic words (from Morley, 2021, p.135)

everyday words		academic words
a lot of		considerable
big		significant
bring together		synthesise
get rid of	→	eradicate
not enough		insufficient
story		anecdote
thing		object
trouble		difficulty
way (of doing)		method
worry		concern

As noted in the table, now is the time to use formal language. Remember, ***"data is"*** should be ***"data are,"*** as it is plural (the singular form is datum). Nevertheless, the force of the world is making it okay to say data is because everybody does it. Fight against this force of the world and do not cave to that one. Use the phrase "*data are"* to show that you are sophisticated and are well-read. Another tip: Be careful about *because* and *since…because* implies cause and *since* implies time, not cause.

"Academic writers generally, however, define terms so that their readers understand exactly what is meant when certain key terms are used. When important words are not clearly understood misinterpretation may result" (Morley, 2021, p. 106). Also consider using attributes and examples-non-examples for big idea constructs (e.g., collaboration, self-directed learning, project-based instruction, instructional leadership, etc.). Three-part definitions are provided with a setting, its description, and an explanation. A few examples of simple three-part definitions.

Table 2

Definitions of Formal Terms

A university is	an institution	where knowledge is produced and passed on to others.
Science is	the systematic study of	the structure and behavior of the physical and natural world through observation and experiment.
Research may be defined as	a systematic process	which consists of three elements or components: (1) a question, problem, or hypothesis, (2) data, and (3) analysis and interpretation of data.

From Morley (2021, p. 106).

Try to not just say the same thing repetitively using the same wordings; instead, convey the same message using different phrasing. On the other hand, consider judiciously using repetitive phrasing that serves as ribbons of the overall style. Those phrases reflect agency and ownership; they also connect lines of thinking throughout the paper without regurgitating or making the writing boring and dry.

Writing the Introductory Paragraphs

Once your 'between and within' sections and paragraphs are roughed out in a sensible manner (and can be further refined later), it is time to write an introductory page that may consist of 3-5 paragraphs and not be more than three pages. Three structures should be present within these 2-3 pages: (a) an opening paragraph about the context of your synthesis, (b) a strong paragraph of your main argument (claim with a hint of warrants), (c) the search process in which you used key words with various databases, and (d) an introductory paragraph orienting the reader to the rest of your synthesis.

Opening Context Paragraph(s). Balance generality and specificity in an opening paragraph. The purpose of it is to frame your interest and why the synthesis is important. The content may relate to current or historical events that shape your study or the variables being studies. Do not begin so broad and vague that the specific context of your study needs to be bridged with peripheral information. At the same time, specificity is to be added along the way.

Main Argument Paragraph(s). Hopefully, the last two chapters can be distilled into a succinct description of your main argument and all the other components (evidence and warrants with backing and qualifiers). And remember, Toulmin's model is useful for highlighting clarity, but it may be useful to use less explicit language. Explicitly locate the essence of your synthesis in its broadest terms with the promissory note that the synthesis eventually details.

Data Base Search with Key Words. This brief, but critical, paragraph needs to explicitly list the keywords you used in your search, which eventually also appear in your abstract. Note the successful combination of delimiters to control the search to a reasonable number. These words also could easily become a good structural pivot that intimate content and help structure the sequence and chronology.

Organizational Paragraph to the Synthesis. After you have contextualized your study, made your main claim (argument), and added the key words, a paragraph is needed to highlight the logic of your entire synthesis, the headings used, and the way they are connected. To make it more interesting, it is useful to not simply list the headings in order but to use some phrases from them and describe their connection. And remember, no headings should bump into each other (be presented contiguously).

Landing on the Method Section

Your concluding paragraph(s) force the reader onto the method section. These last paragraph(s) of your synthesis (and the intervening content) need to be perfectly primed for a method section that references all the information presented in your literature synthesis. Given your argument, you now need to address your paper holistically and provide strong writing that can land on the method section. This next section needs to be based on your literature synthesis and presents the research questions and methods to answer those questions. It reflects the study that you want to do. So, it is important to highlight the reach of your synthesis into the way you can advance the field. You have enough information and structural devices that now you can start to peel away or

feather in the language to further you along toward a tentative conclusionary paragraph that has been anticipated earlier in your paper as an advance organizer.

Initially, your method section presents a thin coverage of the procedures you plan to follow and are addressed in a later section of this book. It is only propped up for the purpose of justifying your synthesis, which must have some reason to live and move the field forward. And so, avoid getting heavy on methods but know that it is there. At present, it is just a wink and a nod toward the methods in your research, but it does reflect a method to your madness: You are trying to control the guessing that someone is making in coming to the same conclusions as you. Consider explicitly indicating whether you are conducting a primary study or conceptual reflections. You can change this orientation, but it would be most efficient if you keep driving towards your dissertation and keep refining the methods section. At some point, after you have conducted the study, the methods section needs to change from the future tense to the past tense.

Note: You do not have to have a hypothesis. You might be testing the differences between treatments or conditions, and therefore are running a significance test with a null hypothesis. It need not be hypothetical, however, if your purpose is more descriptive around a conjecture, a claim, a suspicion, a statement, or an assertion. No standard format exits other than to be explicit and structured.

Appendix A – Direct and Active Writing: Strength in Clarity

Appendix B – Write Right Now Prompt, Concepts/Vocabulary, and Response

Appendix C – Assignment 6

Appendix D – Assignment 6 Review Guide

Book References

Morley, J. (2021). *The Academic Phrasebank: An academic writing resource for students and researchers*. Manchester, England: The University of Manchester.

Urbach, D. (2014). Examining the factor structure of writing assessment based on sets of analytical marking criteria. *Procedia, Social and Behavioral Sciences, 141*(2014), 1106-1111. doi:10.1016/j.sbspro.2014.05.186

Appendix A – Direct and Active Writing: Strength in Clarity

Bronco Nagurski was a football and wrestling legend from International Falls, MN. In college he played for the University of Minnesota (1927-1929) and when he turned professional, played as a tackle on defense and as fullback on offense for the Chicago Bears (1930-1937). His strength was like no other players on the field. After he retired from football, he returned to his hometown and opened a service station. "A local legend claims that Nagurski had the best repeat business in town because he would screw customers' gas caps on so tightly after filling their tanks that no one else in town could unscrew them" (https://en.wikipedia.org/wiki/Bronko_Nagurski). Like Bronco, your writing needs to take command by deploying several strategies.

First, a strong writing style uses an active voice so the subject of the sentence acts on the verb. In contrast, in passive voice, the verb takes over and acts on the subject. Clearly, an active voice is stronger and more directive. Passive verbs include is, was, or were (past participles of 'to be'). Writers may occasionally use passive voice, but it should be used when the focus is on the verb, on a vague subject (e.g., a group not a person where the performer is unknown), or where the context is legal or scientific. As Strunk and White (2000)[1] describe the effect: "The active voice is usually more direct and vigorous than the passive voice…When a sentence is made stronger, it usually becomes shorter. Thus, brevity is a by-product of vigor" (pp. 18-19). Second, follow a few other suggestions (rather than rules) from Strunk and White to compose with a strong writing style.

• Place yourself in the background, often conveyed by proper use of pronouns necessarily connected to subjects who convey the story line, so the reader knows who is speaking.

• Write with nouns and verbs…" not with adjectives and adverbs. The adjective hasn't been built that can pull a weak or inaccurate noun out of a tight place." (p. 71).

• Revise and rewrite. Free writing (with a design in mind) can often jump start the voice and general design). Later, in reviewing the text, snippets can be pulled out, drawn, and quartered, placed at the end, and simply rearranged to create the structure and the voice.

• Avoid the use of qualifiers…" Rather, very, little, pretty – these are the leeches that infest the pond of prose, sucking the blood out of words" (p. 73). Also avoid meaningless subjects like 'there' and 'it' as they are weak and point to vague and irrefutable conjectures.

• Be clear by using various writing techniques: topic sentences that guide the reader in the microsystem of paragraphs, transition words that serve as road signs across paragraphs, and logical sections that build like a Lego® structure and frame the entire composition.

WRN can be used to enhance writers' style by developing exercises that reflect many of these strategies to write from a position of strength and vigor. In the prompt, list sentences that use challenging styles (poorly framed sentences). Highlight the words in buckets: Ill-defined nouns and pronouns, transition words, and passive voice. Challenge students to re-write the sentences that remove the challenging style and reflect a stronger sentence.

Moral of this blog: Writing style needs to be tendered with care and discipline, conveyed in specific contexts, and practiced with sufficient frequency to be instantiated. Importantly, active writing does not just happen but needs to be explicitly taught.

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[1] Strunk Jr., W., & White, E. B. (2000). *The elements of style (4th Ed.)*. Needham Heights, MA: Pearson Education.

Appendix B – Write Right Now Prompt, Concepts/Vocabulary, and Response

Prompt

Highlight key variables in your literature that lean toward methods.

Use any/some of the following concepts (underlined phrase below) and the vocabulary words within them.

Concepts/Vocabulary

Depth-Breadth: age, analyses, argument, claim, collection, conclude, conjectures, consistent, contrast, data, define, depend, direct, discuss, empirical, extend, extent, exhaust, evidence, figures, grade, headings, hypotheses, inferences, interactions, introduction, justify, limit, logical, measure, method, model, next, necessitate, participants, performance, preclude, predictions, prevent, provide, purpose, questions, rationale, reason, relate, relations, respond, report, result, sample, summary, student, survey, tables

Response

My concluding paragraph(s) will reflect the following points/issues I raised in my literature synthesis

Theoretical conception and rationale (acquisition and participation)

Purpose and main argument (of the need for both academic and social measures)

Importance of the age/grade (kindergarten students)

Sweep (summary) of my headings

Discussion of the measures (and their technical adequacy) and collection of evidence

Brief reference to empirical literature

Potential methods to provide the evidence (supporting my claim)

Potential analyses to follow up on the main argument

Appendix C – Assignment 6

Conclude your introduction to explicitly land on the methods using both the logic of argumentation, structure, and transition devices. From Tindal, Irvin, Nese, and Slater (2015).

Conclusion

In this study, we used the acquisition and participation metaphor from Sfard (1998) as necessary for learning when children enter kindergarten. She had argued that the choice in learning was not either one or the other but both. One term depended upon the other term for complete analysis of learning.

Specifically, we focused on score meaning in both classroom achievement and social, self-regulatory interactions to reflect these two components, respectively. We summarized two measurement systems from existing literature the Kindergarten Assessment based on easyCBM and a social behavior rating scale. Importantly, their technical adequacy has been established and allowed us to address three questions using different analytical procedures:

What are the levels of performance in both skill acquisition and classroom interaction/participation when children enter kindergarten?

How do the items and measures consistently cluster into a score that can be reported?

Is there a structural relation between student achievement (proficiency in literacy and number operations) and teacher judgments of student interactions in the classroom that potentially explain the relations among the measures?

To address these three questions, respectively, we descriptively report outcomes, conduct an exploratory factor analysis, and use structural equation modeling.

Assignment References

Tindal, G., Irvin, P., Nese, J. F. T., & Slater, S. (2015). Skills for children entering kindergarten.

Educational Assessment, *20*(4), 297-319.

Appendix D – Assignment Review Guide

Conclude your introduction to explicitly land on the methods using the logic of argumentation, structure, and transition devices.

Note 1: As always, not all issues need to present but enough should be as to warrant the study.

Is a point of view visible in the argument favoring a claim?
Are definitions of key terms provided that can be made operational in a Method section?

Do the headings logically reflect the content within each section?

Does successive headings and paragraphs lead to a conclusion using transition devices?

Are findings referenced that relate to the concluding purpose of the study?

Are direct sentences and active voice used, with the verb near the front not at the end?

Are methodological variables considered (reviewed) in proposing the specific research study?

Is the concluding paragraph reflective of the content from the synthesis?

Does the literature synthesis make you think "of course, the next step in this research is to…"?

Is the purpose of the study doable?

Is the purpose of the study disconfirmable?

Can the concluding paragraph lead to a Method section depicting settings, samples, measures, research designs and analyses?

Is there an inherent isomorphism between the opening paragraphs (introduction) and the conclusion (purpose of the study)?

Are both forms of references used: (Tindal, 2021) and Tindal (2021)?

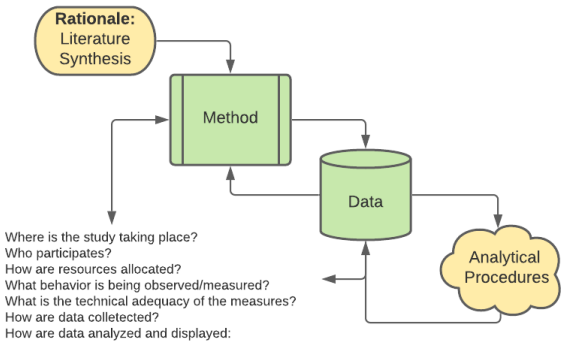
Chapter 7

Method Section

BRT

behavioral research & teaching

As we move to the method section of your paper, it is important to realize that literature synthesis is in the service of something. Typically, the literature you have synthesized provides sufficient justification to collect and analyze more data, either directly (as in primary data) or from an extant data base or repository. If primary data are being collected, the unit of analysis can be students, parents, community members, teachers, or administrators, which is an important consideration that controls the variance. Furthermore, data can be collected in any number of ways, through surveys, interviews, observations, or performance assessments. This chapter focuses on **how** you plan to collect data (quantitative or qualitative) to provide sufficient evidence that supports your claim (within the confines of your warrants). In this chapter, the strategies you propose need to be flexible, as changes may be needed when the actual time occurs to implement the study.



Appendix A – The Specificity of Words: Research Methods in America's Test Kitchen

The chapter is organized into two major sections: consideration of general issues relevant for data collection, and then specific issues that need to be considered. Not only can this section serve as a reflection on your literature synthesis, but it can also be used to anticipate your results. In fact, it might be a promising idea to generate simulated results and populate tables and figures as exemplars, just remember to replace them later when real data are obtained. Realize that the backup plan, if data cannot be collected because of the severe time crunch, switch to extant data files (if possible) or consider your literature synthesis a conceptual thesis.

General Issues for a Method Section

Given the literature synthesis results in a framed argument (with a claim backed by evidence with warrants), the method section is best written as a response to the last paragraph of the synthesis. Because your literature synthesis includes an argument based on a claim with evidence and warrants supporting it, the methods section needs to specifically lead to extending either the evidence or the warrants. A standard introductory paragraph in the method section should present the plan for conducting the research in a traditional manner. It should support the rationale for the setting, the participants, the measures, the data sets, the data collection procedures, the analyses, as well as visual displays. Rather than simply stating these headings as a simple list, it is important to write them out as a response to the conclusion (the last paragraph in the synthesis), and conceptually thread them together.

A method section can easily be organized if the tabled approach is used to organize the studies, using the column headers to tease out previous primary studies used in setting up your own study. In contrast, if the reasoning approach is used to organize your literature synthesis, it is likely that a hypothesis is present. Your method section then needs to be derived explicitly from

your hypothesis. Keep in mind that in social sciences, we **do not** prove anything in research. If anything, if you do have hypotheses, they are propped up with a null hypothesis, which we tend to put up as a "straw dog" to be refuted. If significant results are obtained, therefore, it must be the alternative hypothesis is likely, which means we are proving nothing other than that a different (alternative) possibility is the better choice.

The method section succeeds primarily on consistency, which buys you a lot of latitude for shorthand, as well as alliteration and rhythm in your writing. A term can fade into the background and then, in an echo, resound again. If the terms are moving around on you though, it might be difficult to create a symphonic build of the literature with the nuances of words.

Specific Issues for a Method Section

The usual topics to address in the method section include settings, participants, measures (instruments), and reliability-validity information supporting them. It should also include data collection procedures (along with training and quality assurance), and finally, data analyses. This chapter addresses these issues in this order. Now is the time to organize subheadings using the APA style noted in the previous chapter. Level 1 is 'Method' and Level 2 would be bold, flush to the left. It is also possible to have subheadings within some of the method sections, which would be Level 3.

Settings. The term "settings" can have many different levels of specificity. Eventually, it becomes a prominent issue in considering external validity (addressed in the next chapter) or the degree to which findings can be generalized. It is important to describe settings in common terms as it is unlikely different settings would be the same. Think about the essential features of the setting, including an appropriate label and description of common functions. For example, although we often use grade level to group students, we also know considerable variation exists among different grade-level classrooms. Students are nested in these classrooms, which are in turn managed by teachers who are nested in school buildings, which differ in terms of the principals who oversee them. Buildings also are grouped into different districts, each overseen by superintendents and local school boards (local educational agencies or LEAs). Naturally, these various LEAs are nested within state education agencies (SEAs) which vary in their funding and regulations, as well as oversight. This inherent variation is important to appreciate, if not describe, and consider when analyzing findings from numerous studies.

Example: In the 42nd annual report to Congress on the Implementation of the Individuals with Disabilities Education Act, North Carolina is reported to have the highest number (1,344) of students under IDEA (ages 3-21) who were categorized as emotionally disturbed and suspended/expelled for more than 10 days, whereas Puerto Rico reported 0 students. This variation is likely to be important, so consider the base rate of participation whatever your unit of analysis. In this example, the setting is "not in school", so it would be important to then consider other possible variations.

Participants (Subjects). The literature synthesis may have noted both methods and findings from previous studies but (in)consistencies and gaps are likely a function of participants as well as settings. To the degree that differences exist in either or both variables, little can be conjectured on your claims without warrants that both bound and contextualize them. An important note: Consider educational research as being defined in terms of samples (not populations) and that the **samples** may or may not be representative of the populations. So please do not use the word population for your eventual study. Several different nouns can be used: subjects, clients, children, parents, teachers, participants, respondents, etc. Whatever term is used, take advantage of their similarity or difference to those referenced in previous research.

Note that increasingly, descriptions of participants need to be sensitive to current most up-to-date terminology. For example, sex is no longer male and female (or girls and boys); increasingly surveys are being deployed with more than these two options, whether it is unidentified or self-declared.

Example 1: Sex may need to include LGBTQ: lesbian, gay, bisexual, transgender, questioning.

Example 2: In addition, language fluency is undergoing different terminology and can vary from English Proficiency to Limited English Proficiency (LEP) or English Learners (Els).

Example 3: Currently, the federal labels for race/ethnicity include American Indian / Alaska Native, Asian, Native Hawaiian/ Pacific Islander, Black / African American, Hispanic / Latino, White, and Multi-Racial, and sometimes, two or more races.

Example 4: Likewise, special education status follows the thirteen federal categories: Autism Spectrum Disorder, Deaf/Blindness, Emotional Disturbance, Hearing Impairment, Intellectual Disability, Other Health Impairment, Orthopedic Impairment, Specific Learning Disability, Visual Impairment, Speech or Language Impairment, Traumatic Brain Injury. Although the physical and perception-based disabilities may be relatively uniform, definitions for high incidence disabilities: learning disabilities, speech-language, and social-emotional disabilities vary in the manner they are assessed.

Example 5: Authoritative information on the prevalence of specific disabilities can be obtained from (U. S. Department of Education, 2020). Furthermore, these rates can also be cross-tabulated by student grade, sex, race-ethnicity. This reference may be supplementary to the main argument, but it is an authoritative, time-stamped reference. Note that the most recent reported rates are from 2018 because the report takes a long time to compile and be approved.

Other categories may apply: Economically Disadvantaged vs Not Economically Disadvantaged; TAG vs Not TAG; English Learners vs Not English Learners; Special Education vs Not Special Education (not by disability), Regular attenders, Achievement in English Language Arts, Achievement in mathematics, Growth in English Language Arts (Grades 3 through 8), Growth in mathematics (Grades 3 through 8), Progress of English learners, 9th grade on-track, and Four-year graduation rates.

Attend to how you came across your sample. What kind of recruitment took place? What is the admission process? If you send out 100 requests to participate and get 10 in response, that is a significant difference. What happened to the 90 that are missing? If you are collecting information from people out in the field, how did that work to end up with the sample that you had and how might that have been different? Be descriptive in how you posted to a site that had the potential for either regionality or in terms of people you are trying to target. Note that you had the posting up for x number of days and had 110 people who showed initial interest and from that 100 people agreed to participate. Basically, document the process with **all the steps** taken along the way. Later in the discussion section, a qualifier may be needed noting that the sample may not be representative of the larger population. Finally, succinctly describe the demographics of participants in your sample.

Terms and Operational Definitions. Explain your constructs clearly at the beginning of your literature synthesis, so that later, in the methods section, you can rope them back in to explain your use of the construct. You do not need to redefine them but use others' definitions and then cite the authors. It might even be advantageous to quote the definition with author, date, and page number in the citation.

Measures. Every empirical study inherently contains a measurement system, whether the design of the study is qualitative or quantitative. Even case studies use a measurement system of sorts, often in the form of quotes and themes grouped into various categories. The best strategy is to use previously published measurement systems if they are available, whether from a specific study or a national data set (like the Early Childhood Longitudinal Studies Program (ECLS).

Use existing measures or borrow measures from other researchers. For example, it may be the case that no complete surveys exist, but some dimensions do exist and can be used to describe or operationalize constructs and variables in your survey. When describing measures, consider a three-level heading with development, pilot survey, and deployment. The following issues also should be considered when selecting surveys and eventually interpreting results: scales, score distribution, response type, decision analysis, and reliability/validity.

Scales. What kind of scale does your measure represent? Any grouping of participants is inherently a nominal scale and then the critical question is about the size of groups for making appropriate comparisons. Most educational measures are likely to be ordinal or interval. The former (ordinal) refers to an ordered set of numbers that vary in some assumed manner less (or lower) to more (or higher). The difference, however, between successive values, is not necessarily the same. Surveys are typically based on ordinal scales, often using a range of 1-3, 1-4, or 1-5 range. Choosing an odd-numbered range is likely to result in a neutral point in the middle (which may or may not be desired). Rarely are greater ranges used as the descriptors of these values are difficult to develop. Several traditional values for ordinal scales involve frequency, importance, or intensity; note that most production responses inherently require such scales. Scales typically have two elements: a dimension (definition) and values (amount/score) along the dimension. For example, the dimension may be pain (defined as acute discomfort in a specific area and the values may range from none (1), mild (2), discomforting (3), distressing (4), horrible (5), and excruciating (6). Whichever the range of score values, an anchor or a

description of that score value must be present. The following examples reflect scales of value/amount on proficiency (skill in teaching a content subject): Beginner, Advanced Beginner, Intermediate, Advanced Intermediate, Entry Level, With Distinction.

• Beginner: The teacher requires close supervision 90-100% of the time managing students with constant monitoring particularly for students with basic skills.

• Advanced Beginner: The teacher requires clinical supervision 75% to 90% of the time managing students with basic skills and 100% of the time managing student with a potpourri of skills

• Intermediate: The teacher requires clinical supervision less than 50% of the time managing students with basic skills and 75% of the time managing patients with a range of skills.

• Advanced Intermediate: The teacher requires clinical supervision less than 25% of the time managing students with advanced skills

• Proficient Level: The teacher requires infrequent clinical supervision managing students of all levels (those with basic skills and those with a range of skills

• Distinguished: The teacher can maintain 100% of classroom without clinical supervision or guidance in managing all students all the time. In addition, the teacher demonstrates at least one of the criteria listed below:

- is consistently proficient at comprehensive assessments, interventions, and reasoning
- assumes a leadership role for managing students with more complex conditions or difficult situations
- is capable of supervising others
- is capable as a consultant or resource for others
- contributes to the enhancement of the classroom with an expansive view of practice and the profession

Adapted from (https://med-fom-clone-pt.sites.olt.ubc.ca/files/2015/02/Rating-Scale-and-Anchor-Descriptors-Oct-2014.pdf)

One of the limitations of ordinal scales is the limitations on appropriate statistics that can be used to summarize performance. The safest strategy is to use non-parametric statistics (e.g., test of proportions) which make no assumption about distributions. Nevertheless, many researchers ignore this limitation and apply parametric statistics (e.g., tests of differences in which the interval is assumed to equal distance between successive values. Furthermore, these differences are assumed to be equal irrespective of where they occur in the range (low or high values). On occasion, such scores are scaled into standard scores (z-scores) that are expressions of the score in standard deviation units.

Score Distribution. Depending on the scale used, the result is a distribution of scores along some continuum. This distribution must be present in any quantitative study and presented in a table for all measures that were used. Traditionally, the following values need to appear: count, mean or average, percentile ranks (25^{th} , 50^{th} , and 75^{th}), standard deviation (the average

deviation across the distribution), standard error of the measure (a function of the reliability of the measure), skewness (a long tail of few performers at either the low end [negative] or at the high end [positive] of the distribution, and kurtosis (the shape of the distribution as tall and skinny with little variation or broad and flat great and consistent variation.

Response Type. Traditional measurement books consider two types of responses: selected or produced. A typical selected response is a multiple-choice item or a matching item. A typical production response involves a performance. Irrespective of which type, development needs to be presented that provides a blueprint of coverage (or various domains) and item specifications that describe the steps in such development.

Decision Analysis. If the purpose of the study is to make a classification decision (e.g., a disability or risk), a receiver operating characteristic (ROC) analysis should be presented. A 2x2 table of predicted and actual results should be presented and the proportions in the four cells are compared to show consistencies and inconsistencies. In the end, four conditions exist: false positives, false negatives, true positives, and true negatives. From these values, sensitivity and specificity are calculated

Time Series Longitudinal Data: If performance is collected over time (with at least three data points), then performance can be summarized as slope (rise over run) or variation (comparisons of low and high values above and below the slope).

Reliability and Validity

The most critical distinction between these two terms is that reliability focuses on the measures and validity focuses on the inference or the decision that can be made from the measures. For a perspective on reliability, see Popham (2018b), and for a perspective on validity, see Popham (2018a). Do the measures used have any kind of reliability or inferences any kind of validity information? The method section is where this information needs to be reported.

Reliability. In a word, reliability is about reproducibility. Will the use of these measures (re)produce the same results in another time or setting? Briefly, four types are considered: *test-retest* (consistency in producing the same score values at different points in time), *inter-judge or inter-rater* (providing the same score values for a performance from one judge (rater) to another judge (rater), *parallel form* (producing the same score values with two or more forms), and *internal consistency* (producing the same score values with different samples of items, like odd-even or first-second half).

Validity. This term can be defined as the truth of the inference being made from the outcomes and like reliability, four types are possible. *Criterion validity* involves comparison of two similar measures and considering the closeness of relations (typically using a correlation coefficient). Two types of criterion validity reflect whether the measures are given at the same time (referred to as *concurrent*) or staggered in time (referred to as *predictive*). *Internal consistency* is considering the representativeness of the items for reflecting the definition of the measure (typically using a factor analysis or alignment analysis). *Statistical conclusion validity* reflects the adequacy of the analytic procedures and often relates to the types of measures used

and the sample size of the participants. Finally, *external validity* reflects the generalizability of the results to other participants or settings.

Data Collection Procedures and Quality Assurance

In the Appendix on America's Test Kitchen, the emphasis is on the preparation and baking of dishes and meals. Every contestant is provided the same task (with some variation in ingredients) but the most variation comes from the process: the way ingredients are mixed and cooked with time and temperature controlled.

The following is an illustrative list of procedures to collect data (see above on response type):

1. *Surveys* may be administered and can vary in the medium (see below for example in whether the survey is sent to respondents via software (e.g., Survey Monkey, Qualtrics, or Google Forms) or paper-pencil, in which case it needs to be mailed. This choice may also influence the distribution access to individuals who either need to be on the internet) as well as the cost (for copying and postage, with return). See Alonzo and Tindal (2021) for a description of both survey development/analysis and sampling plans.
2. *Observations* can be used to capture key responses from participants. Note that they may be systematic (e.g., momentary time sample, whole interval, or spoiled interval) or anecdotal (running record).
3. *Tests and measures* provide a range of possibilities from selected responses to produced responses. Selected responses involve participants being provided options to choose or match. Note that with a technology interface, responses may involve dragging and dropping or sorting, both of which open the possibilities for capturing more advanced cognitive operations. Produced responses can be single words (e.g., cloze), abbreviated answers, or extended responses all of which can be scored using either quantitative counts or qualitative ratings.
4. *Interviews and focus groups* provide rich data for documenting participants' responses. Although quite easy to produce, the actual cost comes in coding the responses.
5. *Extant databases* may be retrieved, in which case, the record is fixed, and the focus is simply on the data analysis.

In all instances of data collection noted above, some type of quality assurance provides a stronger validity argument than simply deploying a method and assuming everything was done correctly. This quality assurance can come from the use of checklists, concurrent and independent recording, or independent recoding after the fact. Finally, an important consideration, particularly in current educational and community settings, is consideration of the digital platforms being used. What is the capability of the equipment in documenting outcomes? What version of software or hardware is used?

APA Guidelines in Data Reporting

The most critical and elegant manner of analyzing data is to format them in a table of descriptive statistics following the APA guidelines. Stay consistent across your paper with naming your figures (Table 1, Table 2, etc.). The table's minimum requirement is to have at least two columns or rows, with only necessary information to guide the reader to your results. Treat the titles of

each table as a heading that is clear and concise. Use horizontal borders to clarify data elements and avoid using vertical borders or borders between cells. Make all values right justified (using a decimal) and round values sensibly (to the tenths or hundredths)

Table 3

Sample Table Showing Decked Heads and P Value Note

Variable	Visual		Infrared		*F*	η
	M	*SD*	*M*	*SD*		
Row 1	3.6	.49	9.2	1.02	69.9***	.12
Row 2	2.4	.67	10.1	.08	42.7***	.23
Row 3	1.2	.78	3.6	.46	53.9***	.34
Row 4	0.8	.93	4.7	.71	21.1***	.45

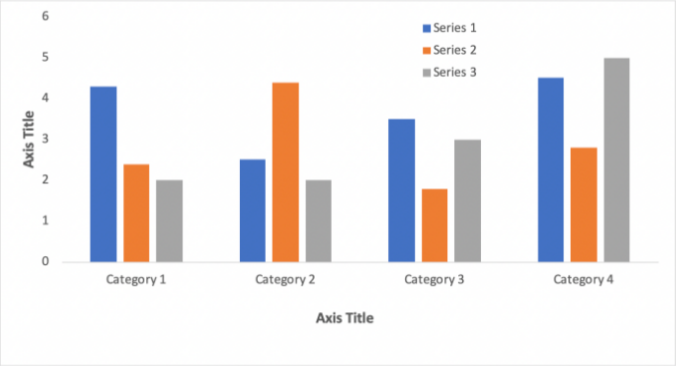
***p < .01.

(https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/apa_tables_and_figures.html)

You also may choose to report your data in a figure, but avoid special effects (e.g., 3-D effect); rather, the figure should be simple and understandable. Assign the correct numbers in the order that figures appear. An italicized figure title needs to be clear and explanatory and appear above the figure. The font used in your figure may be a sans serif font ranging from 8 to 14 point with each axis having a title. A note below the figure may clarify or describe content in the figure.

Figure 1

Sample Figure Title



Note. A note describing content in the figure would appear here.

With the advancement of computer technology and computing power, it is now possible to analyze millions of records, each containing scores of variables, in a matter of seconds. However, data analysis is often just the first step, hence, increasing data visualization is necessary to communicate results effectively. The following are four classic books on visual representation:

Tufte (1983): His first book set the path on a theory of data graphics with excellent coverage of data-ink, 'chartjunk', multifunctioning graphic elements, data density, and aesthetics. As he notes in the opening page: "Graphics reveal data" (p. 13).

Tufte (1990) moves graphic integrity even further by considering flatness, micro/macro readings, layers and separation, representation of multiples, color, other information, and finally time-space in rendering graphs. His coverage of graphics is widely expanded to pictorial displays of information.

Tufte (1997) finally opens the world of graphics to include many different types of images reflecting quantity, visual and statistical thinking to enhance decision-making, pictorial instructions and disinformation, the smallest effective distance, repetition and change, the time-space continuum, and visual confections with juxtapositions that tell a story.

Wainer (1997) describes graphical failures, triumphs with various illustrations, then reviews several graphical forms, methods, as well as strategies to improve graphical presentations.

All four books are landmarks and should be consulted in preparing any figures in your synthesis.

Appendix A – The Specificity of Words: Research Methods

Appendix B – Write Right Now Prompt, Concepts/Vocabulary, and Response

Appendix C – Assignment 7

Appendix D – Assignment 7 Review Guide

Book References

Alonzo, J., & Tindal, G. (2021). *Instrument and survey analysis technical report: program implementation survey*. Eugene, OR: University of Oregon, Behavioral Research and Teaching.

Popham, W. J. (2018a). *Assessment literacy for educators in a hurry – Chapter 2: Validity (The overt in search of the covert)*. Alexandria, VA: Association for Supervision and Curriculum Development.

Popham, W. J. (2018b). *Assessment literacy for educators in a hurry – Chapter 3: Reliability (Assessment's righteous rascal)*. Alexandria, VA: Association for Supervision and Curriculum Development.

Tufte, E. (1983). *The visual display of quantitative information*. Cheshire, CT: Graphics Press.

Tufte, E. (1990). *Envisioning information*. Cheshire, CT: Graphics Press.

Tufte, E. (1997). *Visual explanations: Images and quantities, evidence and narrative*. Cheshire, CT: Graphics Press.

U. S. Department of Education. (2020). *42nd Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act, 2020*. Washington, DC: U. S. Department of Education.

Wainer, H. (1997). *Visual revelations: Graphical tales of fate and deception from Napoleon Bonaparte to Ross Perot*. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Appendix A – The Specificity of Words: Research Methods

America's Test Kitchen (https://www.americastestkitchen.com) provides a scientific analysis of cooking various foods (meats, dishes, fish, breads, etc.) as well as cooking products in a series of seasons and episodes. In a recent review of baking stones and steels for making pizza that is just like the professionals, Lisa McManus describes how they tested several products. In this short video, she describes the experiment, controlling for time, temperature, and various dimensions of the stone or steel for making a great pizza dough. She explains the principles behind the baking process and how the variables come together into conclusions and recommendations. Most importantly, she uses specific words to describe their study and make a recommendation.

In educational science, the same idea of research is used, whether a literature review, descriptive study, or controlled experiment. And it is the *Method* section that provides the details for interpreting the results. In this section, the process for collecting data need to be explicitly described so replication is possible. The setting is an important context for collecting information with small variation possible that can lead to different conclusions. The sample of participants is equally important, whether children, teachers, young adults, parents, or community members. Usually, this aspect of a study leads to limitations in generalizing the results from *samples to populations*, an important issue in educational research.

Data can be collected in several ways, all of which may influence the outcomes: surveys (digital or paper-pencil), individually or collectively (think of the difference between focus groups versus an on-line surveys), proctored or done with no observation, etc. The measures themselves need to withstand the criticism that the outcomes are not reliable (e.g., they might change with different items, forms, samples, occasions, or judges). Data also need to be compiled with quality assurance so that they can be analyzed appropriately with various checks conducted to ensure common sense interpretations.

Finally, the entire enterprise of various research efforts needs to be assembled and fit into a holistic manner that reveals consistencies and inconsistencies. Such patterns can then be tracked back to the Method section and conjectures made that lead to more research, the usual conclusion (and not made just to keep researchers employed). Though the variables and their variation may seem endless, it is helpful to consider the field of medicine, with all the amazing advancements made in the past 100 years. These strides have come about with systematic research, both controlled descriptive studies as well as experiments with controls implemented in trials. And all done with humans who vary as widely in incredible ways.

The moral of this blog: Use **specific** words in either describing educational studies or conducting one (or for that matter, in anything you write or speak). Think about all the variations possible in words like settings, participants, data, measures, collection, analysis, and interpretation.

Appendix B – Write Right Now Prompt, Concepts/Vocabulary, and Response

Prompt

Structure the major variables of your Method Section.

Concepts/Vocabulary

Use any/some of the following concepts (underlined phrase below) and the vocabulary words within them.

Variables: academic, achievement, adult, administer, age, analysis, assert, assign, assist, behavior, characteristic, checklist, children, claim, classify, classroom, collect, community, compare, complete, conclude, contact, context, control, convenience, data, decision, demographic, design, district, experiment, file, gender, grade, group, hypothesis, information, institution, instrument, interval, intervention, instruction, judge, label, language, learner, length, nominate, material, measure, member, missing, organization, parents, participant, performance, population, predict, proficiency, program, publish, purposive, race, random, reliability, response, results, risk, school, season, select, setting, solicit, statistic, student, subject, survey, task, teacher, technical, time, train, use, validity, variable, year

Response

I plan to describe the context/setting for this study by referring to

Time (season), institutions (state education agency), and organizations (schools)

In describing participants/subjects, the most important variables from the literature are

Sampling (selection) from a larger population

Length of time in the program, demographics, ages

The most important measures are

Academic performance in reading and mathematics tasks using published instruments

Checklists of behaviors in classrooms (self-regulation) using a published instrument

The most important technical characteristics of these measures include…

Test-retest reliability of reading and math tasks

Inter-judge reliability for the checklist

Decision-making focuses on making predictions of proficiency

No interventions are used, and no controlling variables are present. The most important analyses of the data are descriptive statistics (ranges, medians, means, standard deviations).

Appendix C – Assignment 7

Write the Method Section using nested headings.

From *Tindal, Irvin, Nese, and Slater (2015)*

Setting-Context: Sample (Participants) – Extant data base

Demographic information on the nominated schools was analyzed on (a) student characteristics (racial/ethnic diversity, socioeconomic status, English language learners, special education status), as well as (b) school characteristics (rural/urban, school size [small vs. large group], and kindergarten program offering [half-day vs. full day]).

In May, ODE sent letters to all district superintendents inviting them to nominate schools in their districts that would be interested in participating as a pilot site. Demographic information about the nominated sites was entered into a stratified random sampling system to assure that there was sufficient diversity to meet the identified criteria noted earlier. In the end, 16 schools in 13 school districts (representing 32 teachers and 1,228 students) across Oregon participated.

Measures

The Oregon Kindergarten Entry Assessment, piloted by the state in September–October 2012, consisted of easyCBM early literacy tasks—LNF, LSF, PSF—and a numeracy task, Numbers and Operations (Alonzo, Tindal, Ulmer, & Glasgow, 2006) and Behavior (The CBRS, termed the "Approaches to Learning," is an observational instrument comprised 17 items (with each item ranging 1–5) that teachers completed for each student.

Data Collection

Training materials were developed, and a series of webinars were conducted throughout the state to ensure that teachers and instructional assistants were professionally trained in test administration. All testing materials were developed for individual administration using a paper–pencil data collection system. ODE posted a Test Administration Manual (www.ode.state.or.us/go/tam) with a special section devoted to the Kindergarten Entry Assessment Training.

Data Analysis

These data were descriptively summarized and then used to conduct an exploratory factor analysis (EFA) with two pilot sub-samples and finally structural equation modeling (SEM), based on the results of the EFA.

Assignment References

Alonzo, J., Tindal, G., Ulmer, K., & Glasgow, A. (2006). *EasyCBM Online Progress Monitoring Assessment System*. Eugene, OR: University of Oregon: Behavioral Research and Teaching.

Bronson, M. B., Goodson, B. D., Layzer, J. I., & Love, J. M. (1990). *Child Behavior Rating Scale*. Cambridge, MA: Abt Associates.

Tindal, G., Irvin, P. S., Nese, J. F. T., & Slater, S. (2015). Skills for children entering kindergarten. *Educational Assessment, 20*, 297–319.

Appendix D – Assignment 7 Review Guide

Write the Method Section using nested headings.

Note 1: The assignment focuses on writing the Method section but also comes with the following caveats.

- *Continue to work on your literature synthesis; it is the primary product for this course.*
- *When writing the Method section, simply list the variables.*
- *Use sentence stems (for example, "the primary measure is a set of survey items that operationalize the constructs of …")*

Note 2: As always, not all issues need to be present but sufficient to warrant the study.

Is the design of the study noted with appropriate organization relative to the hypothesis/claim?

Is the setting, if needed, listed with sufficient detail to generalize?

Participants/subjects are listed with respect to…

- an appropriate label (e.g., children, young adults, teachers, students, parents)
- modifiers (ages, grades, demographics, assignements, etc.)
- selection (reflecting appropriate populations)
- attrition or missing data

Measures are listed (and concurrent potential to describe) with respect to…

- availability (published or researcher developed but available)
- type reflecting a construct (academic achievement, social behavior, proficiency, etc.)
- consideration of reliability (any type appropriate for the study)
- decision-making (validity) relative to (naming-labeling the construct, making predictions, classifying/labeling participants, reflecting proficiency/change)
- collection or administration procedures/protocols (observation/documentation)
- training of data collectors

Are interventions, if deployed, described with sufficient detail to replicate?

Are controlling variables, if necessary, described sufficiently to provide appropriate comparison?

Are data analysis procedures listed to warrant conclusions using descriptive statistics, grouping, and comparisons?

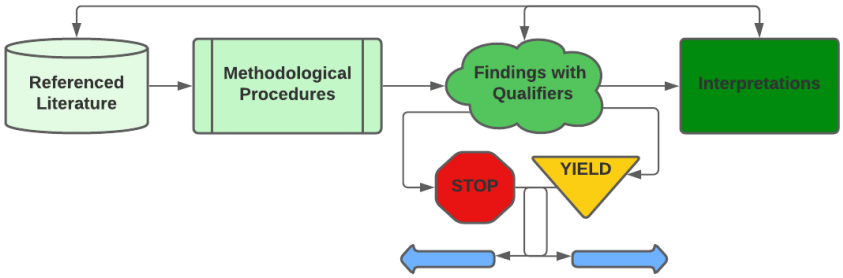
Chapter 8

Discussion Section Written in Anticipation

BRT

behavioral research & teaching

This chapter is about explaining (not reporting) your outcomes. Although it may seem odd to be writing a discussion section without any findings, it is best to assume that your results are present, and even create tables and figures in advance to help you frame the argument. At this stage, do not rush into details, but provide only broad strokes. And think broadly- it is important to take both sides of your argument by providing confirmatory and dis-confirmatory explanations. The issues you raise in this section should provide a base from a 10,000-foot elevation as well as footing that can support your claim with evidence and warrants. Most importantly, you need to make your argument believable and credible.



The structure of the chapter provides guidance from two major sources to judge the quality of the research you have synthesized. The first reference to consider is the source of evidence as outlined in the *Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014). Because all empirical research includes data collection, this reference can be used in asking critical questions of these data. The second reference focuses on research design through the lens of a seminal publication by Shadish, Cook, and Campbell (2002). As they note, these design issues are interconnected and often interact with each other. Note that these issues apply to any type of research on two dimensions that reflect (a) qualitative or quantitative scoring of responses, or (b) experimental, quasi-experimental, or descriptive designs.

Appendix A – Echoes in Writing on What Ifs

Variables to Consider in General

Begin the discussion section with an overall concluding paragraph of your findings. The first paragraph of the discussion should provide essential findings across the various sources of data. This paragraph should be broadly written and avoid reiterating specific findings. Instead, use language that is more sweeping in reference to the settings, samples, methods, (treatments, if any) and key findings. The first paragraph should serve as a starting point and a teaser to the structure of the impending discussion, using topical descriptions (and potential headings) that are about to be read.

In the second paragraph, reflections can be made on the design of the study. For example, using randomized control trials tends to be the most highly valued design but it is difficult to achieve, as it still fails to resolve threats from sample recruitment or the blocking of samples within and across groups. The manner that a study is set up is the key to building a solid validity argument. In the end, no amount of statistical and analytical magic can solve design problems. According to Tindal and Haladyna (2002), two types of evidence are present in any validity argument: procedural evidence and statistical/analytical evidence. And it is the former type that provides

the ultimate certainty in substantiating your argument. In summary, design issues are critical when analyzing data and may reflect confounding issues as described in your method section.

Reflect on the conceptual framework of your synthesis, knitting together key concepts and topical areas. Your previous headers can provide a road map to your explanations: You are filling in both evidence and warrants to support your main conclusions. The discussion section is where the thread needs to connect these expansive ideas: They rise above the specific findings and reach into the theory supporting your research, either inductively or deductively.

While writing your discussion section, review the types of publications: research articles, empirical studies, key publications, etc. Consider the range of the research. Certainly, your references are not all evenly highlighted: some are more pivotal (by the nature of the researcher or the journal in which the study appears). Your literature synthesis ideally has a plethora of reference types, some of them providing definitions or syntheses. Other references need to be empirical, with methods and results used as a fulcrum in your own research, balancing previous findings with various definitions and data collection strategies. Such references provide an opportunity to give temporal relief from the chronology of your review. Combined, these perspectives are ideal in reflecting upon your discussion.

Some researchers add a table somewhere in the discussion section to draw attention to specific methods or findings: Make them summaries that are not repetitious of specific findings. Consider authors, dates, samples, measures, etc. when creating your table with variables (dimensions or issues). In general, document consistencies or inconsistencies, and point them out as an organizer of literature. Generalize by noting the similarities and differences across studies, whether it be differences in settings, samples of participants' age, data collection methods, measures, or outcomes. Note that all research needs to consider participants as samples of populations, that settings can vary, and that outside variables may interfere, all of which can be organized in a table.

And remember, validity needs to be considered as shades of gray that add or subtract to the strength of your argument incrementally. Validity of inferences comes in degrees and is not ‘all or nothing.’ Rather, it can range from possible to plausible, from likely to doubtful. Some of your explanations may be closer to others’ findings while other explanations are more because of various threats to validity.

Five Types of Validity (from Standards, 2014, pages 11-22)

An important source of evidence on the validity of your arguments or inferences is the *Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, & Education, 2014). Although this reference is focused on testing, it is equally applicable to any type of measurement, including observations, surveys of perceptions, and qualitative coding of interviews and focus groups. All empirical research has some type of measurement and data collection procedures. In this book, five sources of validity evidence are considered, with one of them (relations) split into two sources that are further articulated into specific standards.

1. *Evidence Based on Test Content* refers to the format, questions, or wording on a given test. This type of evidence can show the degree to which question/item domains are appropriately present in the interpretations of the test. In this case, appropriate means giving

participants test questions/items that were previously and properly covered or experienced. This type of evidence aims to address the differences in the interpretation of respondents' scores.

Evaluating the correspondence between learning standards and content is called alignment.

2. *Evidence Based on Response Processes* refers to the cognitive process in which the test taker is engaged during the exam. This type of evidence involves a student's access, response time, eye movement, or draft revisions to document the processes deployed and the developmental phases of responses. This type of evidence may reflect unintended influences that can hinder a participant's response and performance.

3. *Evidence Based on Internal Structure* refers to the degree of relationship between questions/items and interpretations of them. Internal structure aims to find responses that are often misinterpreted or different and is often revealed with several components or dimensions overlapping or underlapping. For example, a certain question/item may function differently for subgroups, based on racial or gender differences.

When one question/item has systematically different responses while the test takers are given to a group of similar overall abilities, it is called differential item functioning.

4. *Evidence Based on Relations to Other Variables* considers a combination of variables involved in a study. This type of evidence often includes either planned or predicted relations to another construct and documents these relationships as (in)consistent.

- Convergent and discriminant evidence reflects findings that converge or diverge. For example, a multiple-choice measure of reading comprehension may be related to other measures like reading response and fluency (convergent evidence) but diverge from other skills like logical reasoning (discriminant evidence).

- Measure-criterion relationships refer to the degree of accuracy for which a measure is used.

- Validity generalization refers to the degree of prediction with new or different settings, participants, or measures.

5. Evidence for Validity and Consequences of Testing refers to the interpretations and uses of scores or achievement by the developer, both intended and unintended. For example, this type of evidence can provide data identifying schools with poor performance (intended) that also results in lower enrollment (unintended).

Specific Standards

Cluster 1 - Establishing Intended Uses and Interpretations

1. State clearly how the test scores are intended to be interpreted and used. Test populations and constructs should be established early and clearly.
2. Present a rationale for every intended interpretation, along with both the theory and the evidence.
3. Warn users about making interpretations of the unevaluated or inconsistent questions/items.

4. Collect new interpretations and provide rationale for the scores that have not been validated.
5. Recommend interpretations and evidence for expecting a specific outcome.
6. State explicitly the rationale and theoretical arguments for anticipated indirect outcomes and provide evidence from the literature to suggest the importance of indirect benefits.
7. Document performance properly along with any claims; directly state perceived bias, changes, and instructions for the changes.

Cluster 2 – Issues Regarding Samples and Settings Used in Validation

8. Describe the sample of respondents in detail, including all major sociodemographic and developmental characteristics.
9. Define all the parties involved in the validation process, including their qualification, training, procedures, and clearly state if they had helped participants to reach a decision.
10. Give respondents a detailed explanation of the conditions under which the data are collected, specifically when statistical analysis is included with validity evidence.

Cluster 3 – Specific Forms of Validity Evidence

(a) Content-Oriented Evidence

11. Specify the process of generating content with reference to the intended population, constructs, and domains. Justify the definitions and criteria of content, such as importance, frequency, or criticality.

(b) Evidence Regarding Cognitive Processes

12. Provide empirical evidence to support the score rationale interpretations if the responses depend on cognitive operations.

(c) Evidence Regarding Internal Structure

13. Provide internal structure evidence to support score interpretations if the rationale is dependent on question/item relationship.
14. If interpretations of score differences, profile, or sub scores are suggested, state the rationale, and give evidence to support the interpretations.
15. If specific items suggest a performance interpretation, state the rationale, and give evidence to support the interpretations; potentially warning respondents against them.

(d) Evidence Regarding Relationships with Conceptually Related Constructs

16. Provide the rationale for additional variables when evidence includes empirical analysis of the questions/items.

(e) Evidence Regarding Relationships with Criteria

17. Provide information on criteria appropriateness and quality if scores relate to more variables.
18. Provide the level of criterion performance related to scores if the level of performance predicts criterion performance.
19. Include scores and all other variables when used in conjunction (to predict criterion or outcome) in the statistical model analysis.
20. Report on the effect size measures when it is used to draw conclusions past the samples or uncertainties of measurements.
21. Report statistical adjustments that were made, including adjusted/unadjusted coefficients, as well as the construct criterion estimates.
22. If planning to use a meta-analysis to indicate strength of a measure-criterion relationship, the variables need to be comparative.
23. Describe in detail the meta-analytic evidence (e.g., coding, methodologies, examining moderator variables) that supports score interpretation.
24. Provide evidence (if possible) for assigning participants to alternative treatments.

(f) Evidence based on Consequences of Measurement

25. Always investigate the source of consequences if outcomes yield unintended consequences results.

Design Issues and Threats from Shadish, Cook, and Campbell (2002)

"Our theory of validity similarly makes some use of each of these approaches to truth – as we believe all practical theories of validity must do. Our theory clearly appeals to the **correspondence** between empirical evidence and abstract inferences. It is sensitive to the degree to which an inference **coheres** with relevant theory and findings. And it has a **pragmatic** emphasis in emphasizing the utility of ruling out the alternative explanations that practicing scientists in a given research area believe could compromise knowledge claims, even though such threats are, in logic, just a subset of all possible alternatives to the claim" (Shadish et al., 2002, p. 36).

This seminal reference considers two pairs of validity. Statistical conclusion validity is considered with internal validity because "both are primarily concerned with study operations and with the relationship between treatment and outcome" (Shadish, Cook, & Campbell, 2002, p. 63). In contrast, they consider construct validity and external validity as related because both address generalizations and generalizability.

We have rearranged this order, however, to reflect the temporal nature of conducting research. The first consideration is about terminology - labels and definitions. Therefore, we consider *construct validity* to be the first out of the starting block. If the research is based on faulty constructs (that lack meaningful labels and definitions), it makes no sense to continue. It is not possible to do the right thing in the wrong way. The second validity type is *internal validity*, which focuses on the design of the study: The *who* and *how* of the study, in terms of allocating resources and assigning conditions, as well as collecting data. In terms of time and events, this validity type is sequentially at the trailhead and focuses on planning. Without a plan, events can happen incidentally and accidentally, confusing the cause-effect relationship. The next validity

type in the sequence is *statistical conclusion*, which focuses on the manner that data are encoded, analyzed, and summarized: Address issues on the selection and deployment of all data collection procedures. Finally, *external validity* is considered by asking "What kind of generalizations can be made to other people, settings, treatments (where needed), and outcomes?

In this book, we have listed them in the order of importance for doctoral dissertations and master's degree theses. The most important type of validity (particularly for anyone conducting their first research study) addresses the definitions of the constructs that are the focus of research. Too often, vague terms and phrases are used that have little possibility of being operationally defined let alone being measured. *Constructs* must not only reach up to the theoretical framework, but they also need to reach down to appropriate measurements/methods. Consequently, the labels carry meaning that also has implications in everyday life. We then address *internal validity* which is a function of the study design. Next, we consider *statistical conclusion* validity which focuses on the integrity of the findings. Last, we address *external validity* to reflect the generalizations that are made, all of which can include the previous types of validity.

Construct Validity. "Constructs deal with the labels, definitions, operationalizations, and measurement. Constructs are what we name things. They are big ideas tied to nomological nets that connect to operational definitions that then give the construct life through measurement (documentation). "Construct validity is fostered by (1) starting with a clear explication of the person, setting, treatment, and outcome constructs of interest; (2) carefully selecting instances that match those constructs; (3) assessing the match between in- stances and constructs to see if any slippage between the two occurred; and (4) re- vising construct descriptions accordingly" (Shadish, Cook, & Campbell, 2002, p. 66). Importantly, constructs apply to persons, settings, treatments, and outcomes (measures and observations).

Table 3.1 (p. 73) – "Threats to Construct Validity: Reasons Why Inferences About the Constructs That Characterize Study Operations May Be Incorrect" from Shadish, Cook, and Campbell (2002). They list the following terms, which we have generously paraphrased.

Construct explication refers to a lack of adequate explication. Because constructs are concepts, this problem can easily come from the lack of sufficient or appropriate attributes, which in turn lead to a limited set of examples (and non-examples). In the end, operationalization of the construct is difficult. An inappropriately explicated construct may be too narrow (e.g., focus on examples instead of attributes) or too broad (lack specific attributes leading to inappropriate examples). Examples of constructs that need attributes and examples: Leadership, effective instruction, social-behavioral disorders (or any disability), English proficiency (or any proficiency), or soft skills for high school students.

Confounded constructs occur when a construct bleeds into related constructs, making it difficult to untangle them. The result is nomological creep that clouds concepts in a failed Venn diagram of underlap or overlap. For example, differences in persons, settings, treatments, and outcomes (measures and observations) are confounded and not clearly specified. For example, any definition of leadership also may be confounded with experience, or degree/certification attainment. If this is the case, then these attributes need to be specified and defined as part of the leadership construct.

Bias from mono-operations and mono-method is a result of constricting a construct (concept) to a single operationalization or measurement/method that confounds the manner of conducting research on the *thing* with the *thing* itself. The result is likely an under-representation of the construct with concurrent confounds. Many findings in social sciences are confined to survey research based on respondent perceptions. To the degree that other methods (like observations or interviews) can be used to triangulate the findings, this threat to validity also can be mitigated.

Levels of construct are not adequately explicated, again resulting in under-representation. If the label (concept) is inappropriately broad or narrow, a full range of examples is not present in applications to persons, settings, or treatments. Educational and community settings are often complex settings that can be further explicated by reference to more specific levels. For example, a general education classroom setting often includes separate resources that are provided by special education teachers. Without considering the model of special service delivery, the general education setting is under-represented.

Factorial structure is considered with treatments by Shadish, Cook, and Campbell (2002), but may be most applicable through the method/measurement as it applies to persons, settings, and treatments. The critical issue is the singularity of the construct when used in a definition: Does it apply equally to different samples of the population, in a range of settings, and with specific treatments? One of the most effective strategies to document factorial consistency is through factor analysis (either exploratory or confirmatory). In this analysis, items are inter-correlated and, using specific models, are aligned with factors that are subsequently named in an inductive process.

Reactivity from self-reports, and within settings is primarily person centered, referring to motivations and intentions, as well as perceived consequences by respondents. Anyone providing information to a researcher is responding in a context with perceptions and expectations, either formally or incidentally established, and with this threat, provides only a partial specification of the construct. A construct is underrepresented when it is confounded with these restrictions and needs to be qualified. Subjective data (perceptions and ratings) are often collected using an ordinal scale that is summed (and subjected to factor analysis). If participants/respondents try to anticipate the purpose of the research as anything different than that presented by the researcher, they introduce their own unique values.

Compensation includes both equalization and rivalry, both of which are person-centered reactions from participants but with similar impact on the construct. In the former (equalization), the construct is adjusted with respondents participating by consideration of outcomes (that might be beneficial in either a benefiting or discounting way for subgroups). When participants are assigned to (treatment) conditions, they may react in any number of ways: disappointed or even relieved with an assignment to control condition; they may also experience anticipation and expectations of how the study should be conducted or be hesitant of continuing (which would then lead to dropping out). All these compensations influence the construct.

Both resentful *demoralization and diffusion* are treatment specific confounds that make any construct difficult to define. In the former (demoralization) comes from respondents while diffusion may arise from the researcher or the setting. In either case, responses are compromised in untoward ways, limiting any uniform reference to the construct. Once a study has begun,

respondents may become dissatisfied or disappointed in the way the study is being implemented, which in turn influences their performance or responses.

Unanticipated conditions are primarily setting oriented and refer to any disruptions that may occur during data collection, and therefore result in a construct being misrepresented. It is also possible that these conditions are disrupted by people within the setting. During data collection, any number of disruptions can occur: Fire drill in a school, unanticipated visit by an authority, severe weather that closes schools, upsurges of COVID-19, etc. All these examples are likely to influence data collection, irrespective of method (survey, observation, testing, interviewing etc.)

Internal Validity. As the main word implies (internal), the focus on this type of validity is the influence from the design of the study (the way the study is conducted): Which variables are manipulated or measured and how well do the inferences correspond between the covariation of the 'treatment' and the 'outcomes?' How does the design influence any inference about relations or cause effect that hold variation, person treatments, settings, etc. We have rearranged the order listed in this publication to reflect a more appropriate order for dissertations and theses.

Table 2.4 (p. 55) – Threats to Internal Validity: Reasons Why Inferences That the Relationship Between Two Variables Is Causal May Be Incorrect from Shadish, Cook, and Campbell (2002).

Recruitment and selection participants can threaten internal validity by raising interfering confounds that mediate any interpretations of relations and may influence outcomes. This threat can only be avoided by documenting person characteristics and considering them in various supplemental analyses. The process for including participants in a study begins with recruitment and then moves to selection. The degree to which the initial pool of participants has some characteristics in common and others that are unique is an important distinction. For example, in any educational study, teachers may be similar in their educational training (and certification) but vary in their race-ethnicity; they may vary in age (and relatedly, experience with technology). Once recruited and selected, such differences may be ignored, and therefore become a limitation to any inferences made from the outcomes.

Attrition is the other side of recruitment and selection. It refers to the possibility that the eventual sample at the end of the study is different from the initial sample at the start of the study. The most significant problem is the effect this dimension has on missing data, with two possibilities: *missing at random* (the pattern of missingness is related to the observed data only) or *missing completely at random* (the pattern of missingness has nothing to do with any other variables). This problem is quite likely in longitudinal studies that last over time (many years) or even research conducted over the course of a year. When participants drop out, it is often difficult to understand the motivation for this decision (as well as various demographics that may be associated with the reason to withdraw). For example, participants have study-related reasons (disagreements with the manner of data collection or data collectors), or their withdrawal may relate to personal reasons (moving out of the region or taking a new job). In either case, missing data are the result, and it is difficult to neutralize the effect.

Instrumentation is a threat when outcomes vary not only due to the measures but to the data collection system itself. Such threats can be built into the design of the study by accident. This threat includes digital data collection (e.g., different browsers, computers, mobile devices) or from data collectors (observers, surveyors, testers, etc.). All measurement devices are sensitive to a certain degree, much like the difference between a ruler (12 inches) and a yard stick (3 feet).

Likewise, instrumentation threats are closely related to the scale being used (for example, see the earlier presentation on ordinal versus interval measures). For example, many production/performance tasks use ordinal scales (particularly writing assessments). Such measures are inherently less sensitive than interval measures (e.g., number of words or unique words written). Furthermore, the data collection procedure may be paper-pencil or digital. In the example of writing, measures are likely to be digital. To the degree that two different systems are used, comparisons could be compromised.

The sequence of events can serve as a threat by the very nature of confusing cause with effect. Causes must occur first and be clearly documented. An important side issue underlying this threat is making a clear distinction between the independent and dependent variables. Causes are the independent variable (and are manipulated by design) while effects are the dependent variable and represent the outcome. A subset of this threat is **testing (measuring**) itself: To the degree that successive tests (measures) influence subsequent outcomes, caution should be exercised in making conclusions. The procedures deployed in conducting any study involve several steps that may influence the outcomes. For example, training (in interventions as well as data collection) may provide clues to the participants as to what is coming next. External events may also occur, independent of the procedures used in the study (e.g., registration for school in the fall or state testing programs implemented in the spring). In research that involves multiple measures, feedback (or lack thereof) from earlier outcomes may very well influence later performances. Another example occurs in reading comprehension measures where a single story is used for several questions (items) that may inform each other (serve as 'testlets').

Historical events can occur while a study is being conducted and consequently pose a threat to any conclusions. No research occurs in a vacuum but is conducted in various settings and with participants who experience a range of proximal and distal events, potentially mediating the relation between the cause and the effect. A subset of this, *maturation*, refers to the possibility that participants and settings simply change over time and therefore influence the outcomes. For example, policies change over time in an environment (social, educational, institutional, etc.). Such policies are also a function of economic forces and funding patterns. Regulatory conditions apply as both federal and state agencies implement new/different laws or specific conditions for their implementation. These historical events are furthermore complemented by natural conditions of weather and naturally occurring events. The pandemic of COVID-19 is a classic historical example of an event that changed the outcomes in educational settings at all levels (K-12, community colleges, and institutions of higher education). As a result, many educational studies are moving to pre-pandemic or post-pandemic only research, ignoring outcomes within the initial surge.

The *combination of the above threats* may result in an interaction that compounds and increases the vulnerability of the findings. For example, historical events may interact with recruitment as well as attrition. The additive effect is simply a compounding problem. A sequence of events can interact with each other and interfere with any relation between plausible causes with their effects: recruitment (selection), attrition, historical events, and instrumentation. For example, after participants are selected, a policy or funding change can occur with a subsequent reduction in participation (attrition) with remaining participants performing on different software platforms (modern tablets versus old tablets). In this example, participation interacts with historical events as well as instrumentation. All these threats may threaten the internal validity of the findings (inferences on outcomes).

Statistical Conclusion Validity. With all results needing to be analyzed (whether qualitative or quantitative), statistics are invoked and therefore this type of validity refers to the correspondence between the 'treatment' and the *outcomes*. In particular, the size or strength of this relation needs to be presented, not just the relation between two dimensions.

Table 2.2 (p. 45) – "Threats to Statistical Conclusion Validity: Reasons Why Inferences About Covariation Between Two Variables May Be Incorrect" from Shadish, Cook, and Campbell (2002)

Power refers to the likelihood of finding anything of significance in the relation of the treatment and the outcome. Typically, this dimension is influenced by the sample size: Increases in the sample size make it more likely to find a relation. Currently, this dimension is either expressed as a *p-value*, or more importantly as an *effect size*. This form of reporting is also important to apply appropriately to ensure it is not overestimated or underestimated. Most research is conducted with constraints of funding, time, and available resources. As a result, the number of respondents (participants) is often less than desired. For example, a survey may not allow more than regional representation, an educational intervention or observation may be implemented in only a limited number of classrooms, or interviews/focus groups may only be conducted with a limited sample. For all these reasons, any statistical analyses may be completed but with limited power and therefore, conclusions about no effects being present. Nevertheless, had more respondents participated, such effects might have been found. In the end, a type 2 error is made.

Assumptions of the analytical tests used to document the relation. Typically, any statistical procedure comes with assumptions about the underlying measures and distributions. When incorrect assumptions are made about either, a threat to the outcomes is present. See earlier information in the method chapter. This threat is best avoided by using non-parametric tests (of proportions) when the sample is limited. Reserve parametric statistical tests for studies in which at least 30 respondents are available in any subgroup being used for analysis. Another way to shore up threats to assumptions is to provide extensive descriptive data for the participants, even formally testing various dimensions of the distributions.

Unwarranted attempts to continuously analyze the data in effort to document a relation (referred to as *fishing and the error rate* by Shadish, Cook, and Campbell, 2002). When repeated analyses are made (and uncorrected using specific follow-up techniques), the likelihood of finding a relation increases and is more an artifact than a real finding. An example of this threat is the sequential and repeated analyses of outcomes for every subgroup and then reporting anomalous findings as representative of the entire study. This threat can be constrained by (a) stating clearly the expected direction of the results, and (b) limiting the analyses to this comparison and not continually analyzing data in repeated comparisons.

Measurement limitations (unreliability and restricted range) are always a possibility and need to be explicitly investigated. To avoid this threat, reliability of the measures should be documented (using any of the four types as appropriate) and descriptive statistics presented for the total sample as well as subgroups. An example of this threat is the use of ordinal scales, which often have crude scaling properties. If observations are being used, the intervals for conducting them need to be representative of the phenomenon being documented. Interviews, if used, need to be transcribed and coded to thoroughly represent the variable of interest with inter-judge reliability reported.

Treatment integrity (fidelity) and variance are setting dimensions and occur when conditions are not applied in a uniform manner, or the setting includes extraneous variance that is not documented. Both result in inappropriate conclusions. Any intervention needs to not only be defined but also observed to ensure it is appropriately implemented. Interventions can be confounded in two ways: (a) critical components are not present and should be or, (b) extraneous components are introduced (inadvertently). Because most interventions are complex packages, they may need to be parsed. One of the best depictions of intervention testing comes from (Kazdin & Wilson, 1978) with several possibilities available: (a) treatment package comparisons that include many elements compared to no elements, (b) constructive strategies that deploy adding singular components to determine separate effects, (c) dismantling treatment components (the oppositive of constructive) to determine separate treatment effects, (d) parametric strategies that systemically vary time, frequency, dosage etc., (e) comparative strategies with different treatment packages implemented and compared, (f) client-therapist (or teacher-student) variation with specific characteristics studied, and (g) process strategies with explicit documentation of treatment implementation.

Sample heterogeneity is clearly focused on person characteristics and when great variance exists, threats to the relation between the treatment (condition) and the outcomes are possible. When teachers, students, community members vary on several study relevant variables, it is possible that inferences from the findings are threatened. Indeed, the conclusion may be incorrectly made about the effects due to unknown characteristics in the sample when in fact, these study-relevant characteristics provide the main 'explanation' for the findings.

External Validity. This form of validity addresses the generalizability of the findings (or cause-effect relations) to other (different) persons, settings, treatments, or outcomes (methods and measures). These generalizations can move from a broader to a narrower perspective (populations to samples), narrower to broader (samples to populations), or simply be at the same level. The following threats are identified by Shadish, Cook, and Campbell (2002). Although these authors reference this type of validity as interactions, we simply note each singular focus with the potential for them to interact with each other.

Table 3.2 (p. 87) – "Threats to External Validity: Reasons Why Inferences About How Study Results Would Hold Over Variations in Persons, Settings, Treatments, and Outcomes May Be Incorrect" from Shadish, Cook, and Campbell (2002).

A *person's* focus reflects the degree to which findings can apply to other samples. In the method chapter, an important distinction was made between samples and populations. Given restrictions in recruitment, time, cost, and level of effort, any study samples from a larger group. Therefore, this form of validity focuses on generalizing to this larger group. The most important participant characteristics involve either *endogenous* or *exogenous* variables, the latter of which are often ignored. Endogenous characteristics involve race/ethnicity, sex, disability, and language proficiency. Exogenous variables focus on school records (e.g., attendance, schedules, etc.) or experiences (training and certifications). Irrespective of source, these person variables may influence any inferences made from the outcomes.

Treatment variation addresses intervention variation, where appropriate. Three caveats are important considerations on the ability to generalize findings (or causal relations):

1. Treatment fidelity is rarely studied in education, which is unfortunate.
2. Increasingly, studies are being implemented with a treatment (intervention) compared to *business as usual (BAU)*, which is a terrible idea.
3. Distinctions need to be made between a comparison group and a control group, the former of which refers to a different (but relatively unspecified intervention, while the latter highlights specific variables that are controlled). Most settings and education/community interventions are likely to be complex packages that involve people and procedures, which is where the variation enters. To the degree that training can be provided (and monitored), such variation is less likely and therefore the inferences made from the outcomes can be trusted.

Settings refer to the social-institutional variables in which the research is conducted, and external validity focuses on the ability to generalize to non-sampled settings. Settings can be considered at any level of breadth. For example, an intervention such as response-intervention (RTI) can be viewed at the classroom, building, district (all of which are local educational agencies) as well as at the state or federal level, which are likely to be oriented around policy analyses. Several different variables are threats to validity, most of which deal with the size and types of participants. For example, a classroom of three students being pulled out for special interventions in reading is vastly different than whole group instruction in a classroom of 30 students. Settings may also be described in their (a) purpose and mission, (b) history of service, and (c) catchment (the immediate process for recruitment/placement), and (d) context of funding.

Outcomes inherently limit external validity and may be considered within and across methods and measures. For example, if a survey is administered, the findings may be compared to other (similar) surveys or to observations made on the same construct. Outcomes are mostly limited by the method of data collection used and time/timing of such data collection. To the degree that multiple methods of data collection can be used, and the findings triangulated, the greater the likelihood of the inference being trustworthy. Nevertheless, the more distant the findings are from the literature being cited, the more potential for creating discrepancies in past versus current research.

Mediation refers to intervening (and often unknown) variables/issues that are present, which may limit generalizations. Of course, this type of threat to external validity is best anticipated (understood ahead of time) and activated in the design of the study. It is likely that any of the above variables interacts (and mediates) other variables in this list, as well as other sources of validity treats. For example, settings for mental health or drug treatment can vary from transitory (walk in clinics or therapies), to voluntary short-term stays, to involuntary long-term commitments. These settings, therefore, also are likely to vary in the personal characteristics of who is present, whether therapists and clients, or teachers and students.

Phrases Useful for a Discussion Section

In this section, we provide examples of phrases that may be useful in writing your discussion. These phrases are from a Word Bank compiled by Morley (2021, p. 49): Academic Phrasebank: An academic writing resource for students and researchers.

When first introducing your research: *This study sets out to determine the predictive validity of the…*

Giving reasons why a particular method was adopted: *X was selected for its reliability and validity*.

Giving reasons why a particular method was rejected*: However, this method clearly is not valid for analyzing long-term trends in …*

When identifying a weakness in a single study or paper:

- *However, the study suffers from poor external validity*.
- *The analysis is largely superficial, based solely on …*
- *The sample size in this study was relatively small …*
- *This research has several methodological weaknesses*.
- *The degree of X experienced by patients was not measured*.
- *A major weakness with this study is that there was no control for X*.
- *A major problem with this experiment was that no control for X was used*.
- *The main methodological weakness is that X was only monitored for 12 months*.
- *One of the problems with the instrument the researchers used to measure X was…*
- *No attempt has been made to estimate the risk of/determine whether/investigate whether/quantify the degree of…*

When introducing problems and limitations with a method or practice: *selection bias is a potential threat to internal validity*.

When making suggestions for future work: *Further research/work/studies/investigations are needed/required to confirm and validate these findings*.

Appendix A – Echo Writing on What Ifs

Appendix B – Write Right Now Prompt, Concepts/Vocabulary, and Response

Appendix C – Assignment 8

Appendix D – Assignment 8 Review Guide

Book References

American Educational Research Association, American Psychological Association, & Education, N. C. o. M. i. (2014). *Standards for educational and psychological testing* (7th ed.). Washington, DC: American Educational Research Association,.

Kazdin, A. E., & Wilson, G. T. (1978). *Evaluation of behavior therapy: Issues, evidence, and research strategies*. Lincoln, NB: The University of Nebraska Press.

Morley, J. (2021). *The Academic Phrasebank: An academic writing resource for students and researchers*. Manchester, England: The University of Manchester.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalizes causal inference*. Boston: Houghton Mifflin Company.

Tindal, G., & Haladyna, T. (2002). *Large scale assessment programs for all students: validity, technical adequacy, and implementation*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Appendix A – Echoes in Writing on What Ifs

The Rocky Mountains are very big and far apart. It takes a long time for an echo to bounce back off one of these mountains. One night, a camper in the Rockies went to sleep early. But before climbing into his sleeping bag he yelled, "Time to get up." And eight hours later, the echo came back and woke him up![1]

In writing, the discussion section provides the writer an opportunity to echo something previously appearing in the literature synthesis. Like an echo in hearing, this echo in writing is slightly different, in tone or density. Furthermore, this echo needs to be controlled and offered in subtle ways to allow the reader connections between what was written and what is about to be written. If the content is the same, then it is simply repetition. Rather, the content needs to vary in a simple manner that moves the ideas forward incrementally, neither too fast nor too slow.

The discussion section should echo what was previously presented but also render the content differently in both structure and transitions. It should reflect important issues that were previously noted in the synthesis. Importantly, the content should thread the needle through themes and interconnections. Whereas previous content may have been presented with a particular structure (e.g., chronological, methodological, theoretical, etc.), the content in the discussion is best structured in a slightly different manner. Similarly, certain transition devices may have been used to connect content, but in the discussion section, different transition devices are needed.

The effect of this echo in the discussion is to tie up loose ends, recalibrate the story line, and move past your initial claim (which was set up with evidence and warrants from others' research) to now include the way the study was completed (the method section) and with new evidence (the results section). In many ways, this echo is particularized- after all, the critical settings, samples, measures, and data collection procedures are inherently unique. But they can be used to bridge into more general methods and findings from others.

In some of these references, consistencies can be noted while in others, inconsistencies are in order. Irrespective of either, the critical issue is the explanation: Why would this occur? How could this occur? Under what conditions (where and when) might this occur? Answers to these questions are likely to be conjectures but now being made with the historical note of your study having been completed and published (as a dissertation or an empirical article).

All these reflections need to echo the main claim and expand it in layers. As these reflections land on a point of view, two important components also need to be present: A limitations subsection and a conclusion subsection. Both subsections effectively tidy up the main claim and provide a step toward further research (perhaps with important modifications).

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[1] https://www.jokebuddha.com/joke/The_Rocky_Mountains_are_1
This image was acquired from Pixabay. It was marked as Public Domain or CC0 and is free to use.

Appendix B – Write Right Now Prompt, Concepts/Vocabulary, and Response

Prompt

Preflect upon the fit of your findings from either a confirmatory (supportive findings) or disconfirmatory perspective (unsupportive findings) using traditional ideas behind validity.

Use any/some of the following concepts (underlined phrase below) and the vocabulary words within them.

Concepts/Vocabulary

Variables: address, administration, assess, attrition, attend, bias, change, conclude, confound, confuse, consistent, construct, correlate, covary, create, decision, different, effect, error, establish, expect, extend, external, fail, heterogeneity, homogeneity, impact, implication, inference, inflate, internal, irrelevant, level, limitation, literature, measurement, method, modify, novel, observed, operational, outcome, pattern, population, previous, reference, relate, relation, reliable, results, sample, significant, similar, statistical, strength, strong, surprising, support, systematic, theory, threat, treatment, unexpected, unexpected, valid, variable, variation, varying, weakness

Response

My plan is based on the discussion of the outcomes from the paper by Tindal, Irvin, Nese, and Slater (2015).

Describe how I recruited districts and schools and how they in turn submitted data in the pilot

- These variables influence external validity.

Describe the demographics of the students (as well as the schools).

- Again, the demographics influence external validity.

Consider how teachers were trained in the administration of the KRA

- This could influence reactivity and self-report changes (construct validity)

Note the reliability of the measures for making valid conclusions about readiness

- Clearly statistical conclusion validity is affected.

Describe the relation of the measures to each other (within and across academic and social behavior)

- This avoids mono-operation bias by involving more than one measures.

- My analysis uses several descriptive statistics, and a factor analysis so statistical conclusion validity should be alright

These issues reflect confounds as noted by Shadish et al. (2002), including internal validity, external validity, and statistical conclusion validity. My study primarily attends to external validity of samples, construct validity (of readiness), and statistical conclusion validity.

Most prior studies have not concurrently addressed these types of validity.

However, I expect to see similar results with previous studies: Academic measures explain most of the variance in later achievement. As the population sample becomes older, these findings become even more clear (which is another way of saying these relations are a function of the age of the student and for younger students, the relations are less stable).

The findings that social regulation behavior is significantly related to academic skills and may even serve as a causal variable; this finding is surprising and unexpected.

Also, the confirmatory factor structure of self-regulation was somewhat expected, though the difference between social-cooperation versus compliance-completion was unexpected.

WriteRightNow References

Tindal, G., Irvin, P., Nese, J. F. T., & Slater, S. (2015). Skills for children entering kindergarten. *Educational Assessment, 20*(4), 297-319.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalizes causal inference*. Boston: Houghton Mifflin Company.

Appendix C – Assignment 8

Write the Discussion Section from two perspectives: confirming and/or disconfirming the results relative to the literature. Consider the logic, the methods, and relevant issues of internal and external validity.

Describe how I recruited districts and schools and how they in turn submitted data in the pilot

- These variables influence external validity.

Describe the demographics of the students (as well as the schools).

- Again, these variables influence external validity.

Consider how teachers were trained in the administration of the KRA

- This could influence reactivity and self-report changes (construct validity)

Note the reliability of the measures for making valid conclusions about readiness

- Clearly statistical conclusion validity is affected.

Describe the relation of the measures to each other (within and across academic and social behavior)

- This avoids mono-operation bias by involving more than one measures.
- My analysis uses several descriptive statistics, and a factor analysis so statistical conclusion validity should be alright

The following confounds may appear in my study as noted from Shadish et al. (2002) including internal validity, external validity, and statistical conclusion validity. My study primarily attends to external validity of samples, construct validity (of readiness), and statistical conclusion validity.

Most prior studies have not concurrently addressed these types of validity.

However, I expect to see comparable results with previous studies: Academic measures explain most of the variance in later achievement. As the population sample becomes older, these findings become even more clear (which is another way of saying these relations are a function of the age of the student and for younger students, the relations are less stable).

The findings that social regulation behavior is significantly related to academic skills and may even serve as a causal variable; this finding is surprising and unexpected.

Also, the confirmatory factor structure of self-regulation was somewhat expected, though the difference between social-cooperation versus compliance-completion was unexpected.

Appendix D – Assignment 8 Review Guide

Write the Discussion Section from two perspectives: confirming or disconfirming the results relative to the literature. Consider the logic, the methods, and relevant issues of internal and external validity.

Note 1: The assignment focuses on writing the Discussion section but also comes with the following caveats.

- Consider the literature that you have reviewed
- Think about the way this literature has opened the door for your (eventual study)
- Preflect on confounding variables in this literature (and how your proposal advances the field)
- Select a few of the prominent threats from Shadish et al. (2002)

Consider the big buckets: (a) internal validity (the way the study is conducted), (b) external validity (the targeted samples selected to represent the populations for generalizing), (c) construct validity (what/how we label concepts and big ideas), and (d) statistical conclusion validity (the way data are rendered and analyzed). Briefly consider the following variables:

- Allocation of resources and design of the study
- Events
- Slippage
- Participants
- Training-Treatment
- Measures
- Scaling
- Analysis

Assignment References

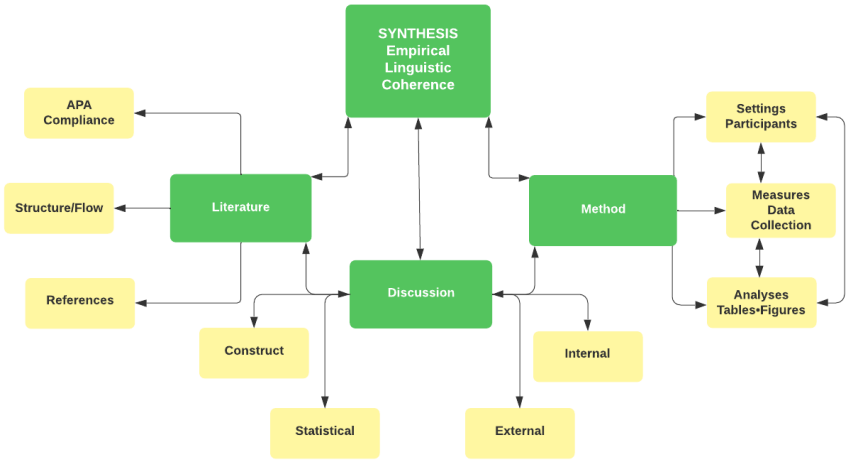
Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalizes causal inference*. Boston: Houghton Mifflin Company.

Chapter 9

Flight Check for Finalizing the Literature Synthesis

behavioral research & teaching

The purpose of this chapter is to guide you into wrapping up your paper, putting a bow on it, and submitting it as a final draft. In this process, the sweep should holistically consider coherence in empiricism before addressing coherence in language. Then you can end with attention to the APA patrol for completing the title page, abstract, and references as well as a final flight check. Together, these issues interact and effectively lead the reader to not only understand your proposal but also find it credible and authoritative. In this sweeping process and in adding these last three components, the most important consideration is accuracy and correctness. Nothing can torpedo your paper more than mistakes, whether they are simple misspellings or non-compliance with APA guidelines. Such discrepancies tend to downgrade the viability and validity of your entire synthesis. Now is time to refine your writing, attend to the nuances of logic and language, feathering out your point of view. All the previous chapters should now make sense.



- Chapters 1 and 2 focused on data bases and literature searches to develop an authoritative basis.
- Chapter 3 addressed synthesizing literature not just summarizing, using a tabular or reasoning approach (inductive and deductive).
- Chapter 4 anchored your synthesis into an argument that was based on a perspective, a well-disciplined point of view.
- Chapter 5 gave your paper shape (an overarching form to the entire synthesis) and focused on both structure (headings) and transitional devices to carry the story in local ways.
- Chapter 6 leaned on this structure to provide an entrance (an opening paragraph) and an exist (a concluding paragraph) that served as bookends.
- Chapter 7 concentrated on the method section that needs to be an extension of your synthesis, adding to the literature and providing the *raison d'etre* for it.
- Chapter 8 was about pre-reflections, conjectures that anticipate findings, either confirmatory or disconfirmatory.

Now in Chapter 9, we pull these chapters together to ensure the whole reflects the parts. This chapter is all about balance and finalizing your story. It is about take-off and landing, safely and successfully.

Appendix A – Final Flight Check

Before addressing the coherence of language, however, be certain that your main argument is coherent. The best way to consider the structure is to ask several questions.

- What is the main argument and to what degree do the various sections (signaled by headings) reflect or point to essential elements of this argument?
- Do these sections address the most important warrants?
- Does the evidence support the claims or questions and are they necessarily relevant?
- What kind of qualifiers are presented that mediate the claims, warrants, and evidence?
- Are the structural components parallel in telling the story?
- Can the reader simply jump across them and get the gist of your story?
- Are all important terms defined in an effective manner?
- What consistencies and variations exist in your coverage of previous research?
- What is the ratio of unique to repeated words? Too many of either is likely to be chaotic (with too many unique words) or too boring (with too many repeated words).
- Are transition devices used effectively? For example, in any form of argumentation, these transition devices may reflect various causes, effects, and conclusions.
- Does your synthesis lead to a logical extension worthy of investigation and does the manner for conducting thesis investigation (a.k.a. the method section) provide just the right process for proceeding?
- Has the potential discussion section anticipated appropriate fault lines in both the logic and the process to slide your paper into the jet stream of published research?

Once these questions (and others) are appropriately considered and affirmed, now is the time to address your writing line by line (see Cook, 1985). The language used in this coverage needs to tell a story and be elegant as well as balanced between academic and accessible words. The language also needs to be efficient and effective, not dawdling with cull de sacs. The remainder of the chapter, therefore, addresses **language usage** in your synthesis, various **nits and picks** that are specific to word usage, the **APA patrol**, and a **final flight check** to be completed.

Language Usage

The following suggestions are drawn primarily from books on the writing process and less on writing for research purposes. The reason for leaving these issues last is that they imply a strong governor that can inhibit writing. But now that you have a story, complete with characters (other researchers) and a plot (claim with warrants and evidence), the time has come to ensure proper and compelling language.

Do your topic sentences appropriately prepare the reader for the subsequent content? Are they about the right size (more than a sentence or two and certainly not an entire page)? If too short, consider combining them. If it is too long, break it up. But either of these strategies may require new topic sentences. “In every sequence of sentences you write, you have to balance the principles that make individual sentences clear and the principles that give a sequence of sentences a sense of a cohesive flow. But in that compromise, you must give priority to helping

readers create a sense of *cohesion*. Readers may understand individual sentences, but if they cannot see how that series of sentences "hangs together" then no matter how clear individual sentences are, readers will not feel that they add up to a cumulatively coherent passage" (Williams (2000, p. 101). Although your writing should be direct, it can help to vary the rhythm of your sentences by sprinkling in conditional clauses to provide the reader with more flavor. Think about spiral writing and looping back through to remind the readers where successive content is located. Certain kinds of transitions can be used to make compare-contrast, provide a cause and effect, or describe a chronology. Avoid stuffing all the information into one sentence: It makes a lot more sense to set the trail and let the story come out through successive (topic) sentences.

Review the structure of sentences to ensure they are direct (not indirect) with the main action (carried by the verbs) near the front, not trailing behind near the end with intervening conditional clauses separating them from the subject of the sentence. Williams (2000) suggests that you "first, look at how each sentence begins. Don't read the whole sentence; just skim the first six or seven words" (p. 71). Second, look for characters (and nominalizations that are nouns created from verbs or adverbs), and third, skim the entire paragraph for actions (verbs). If necessary, reassemble the sentences to reflect a cohesive proposition. Note: If no subject is present, rewrite the sentence so it is active. Finally, "you can sometimes detect faulty connections in your writing by reading aloud, a practice that can uncover a variety of problems by forcing you to notice individual words that you might skip over in reading silently" (Cook, 1985, p. 19). By the way: Placing yourself in the sentence as the subject is fine and not to be avoided. At the same time, too much of yourself should be avoided.

Sentences that begin with conditional (dependent) clauses delay the process of understanding. Rather, "begin sentences with short simple words and phrases communicating information that appeared in previous sentences, or with knowledge that you can assume you and your reader share (Williams, 2000, p. 117) and keep your topics short and consistent. These topics can in turn be repeated with slight variation to develop themes. *Balance and symmetry* can be created by using the same form of the prepositional statement (in the stem with the objects listed in seriation or a consistent gerund across several different verbs. Consider using an academic phrase bank to define terms interactively and use these as you see fit. The phrases can be used to expand your phrases, instead of using the same phrase.

Begin your sentences with familiar information (from prior presented content or the readers' background knowledge) and gradually introduce new information with the end sentences providing any unanticipated information. *Coherence* is then created, providing a flow that is developed across successive sentences with easily identified relations to other topics.

Generally, write using *active sentences* (most of the time but not necessarily all the time). Strunk Jr. and White (2000) note that active writing is stronger and more directive: It focuses on the subject of the sentence. Avoid the verb being passive. "If in a series of sentences with active or passive verbs, you find yourself shifting randomly from one subject to another, or worse, you have no consistent subjects at all, then decide whom you want to tell a story about, and then rewrite verbs to either passive or active to make those subjects more consistent. If you need a

passive verb – choose the passive" (Williams, 2000, p. 83). You can decide on an active-passive voice by answering three questions to choose active versus passive: Is it critical for the reader to know who is the subject of the action (verb)? Can a smooth transition be made to the next sentence? Can the sequence of subjects be made more consistent with the central focus? (Williams, 2000).

Be careful with adjectives and adverbs, particularly when scientific qualifiers are used. "Write with nouns and verbs, not with adjectives and adverbs. The adjective hasn't been built that can pull a weak or inaccurate noun out of a tight place" (Strunk Jr. & White, 2000, p. 71)). Furthermore, keep adverbs and verbs close to each other, as well as nouns and adjectives. "An adverb modifying a one-word verb ordinarily goes between the subject and the verb, not between the verb and the object; but it may sometimes follow the object if it remains near the verb" (Cook, 1985, p. 23)). And of course, if the adverb creates an awkward sentence, remove it.

Finally, Williams (2000, p. 140) provides five rules for editing your writing.
"1. Delete words that mean little or nothing.
2. Delete words that repeat the meaning of other words.
3. Delete words whose meaning a reader can infer.
4. Replace a phrase with a word.
5. Change negatives to affirmatives"

The book by Strunk Jr. and White (2000) originally appeared in 1957 and has been revised twice since then. Nevertheless, this book still provides the most concise and authoritative guidance for effective writing. Rather than summarize this book, we suggest purchasing it and following the many precepts within it. So, this summary simply provides an advance organizer on the various chapters.

• Chapter 1 provides grammatical rules for writing (use of commas, possessives, subject verb agreement, etc.).

• Chapter 2 addresses composition with important suggestions in paragraph structure, using a positive and active voice, being concrete and specific, as well as efficient, associating similar words together and ensuring parallelism in structure, and finally, providing a consistent tense in summaries.

• Chapter 3 provides a brief set of guidelines on format.

• Chapter 4 lists many specific words and expressions that are often misused. The list is considerable and organized from A to Z.

• Chapter 5 provides a hefty description of approaches to style with 21 suggestions offered in composing compelling writing. Indeed, they are so compelling the list is quoted below.

"1. Place yourself in the background.
2. Write in a way that comes naturally.
3. Work from a suitable design.
4. Write with nouns and verbs.

5. Revise and rewrite.
6. Do not overwrite.
7. Do not overstate.
8. Avoid the use of qualifiers.
9. Do not affect breezy manner.
10. Use orthodox spelling.
11. Do not explain too much.
12. Do not use awkward adverbs.
13. Make sure the reader knows who is speaking.
14. Avoid fancy words.
15. Do not use dialect unless your ear is good.
16. Be clear.
17. Do not interject opinion.
18. Use figures of speech sparingly.
19. Do not use shortcuts at the cost of clarity.
20. Avoid foreign languages.
21. Prefer the standard to the offbeat" (Strunk Jr. & White, 2000, pp. 65-80).

One last comment on this list: Of the 21 suggestions above, 11 of them are written in the negative (using the words *not* or *avoid*), which violates their 15th compositional principle in Chapter 2 ("Put statements in a positive form", p. 19). The moral of the story is that language is fluid and bends to fit purpose, reflecting the recent publication of *No Rules Rules* (Hastings, 2020). Also see https://www.shortform.com/summary/no-rules-rules-summary-reed-hastings?gclid=EAIaIQobChMIv5H4-7qJ9QIVzB6tBh2KYQkLEAAYASAAEgLW6PD_BwE)

The final book to consider purchasing is *Eats, Shoots, and Leaves* (Truss, 2003), a compendium of rules on punctuation. In this book, the topics range from the 'tractable apostrophe, use of commas, punctuation as an art form (and the use of colons and semi-colons), and finally the appearance of dashes and use of hyphens. She ends with an elegant argument of the changing world of punctuation (including the increasing use of emoticons). "But after journeying through the world of punctuation, and seeing what it can do, I am all the more convinced we should fight like tigers to preserve our punctuation, and we should start now" (Truss, 2003, p. 201). Hint: The cover of this book displays a Panda Bear erasing the first comma so that it reads "Eats Shoots, and Leaves," rendering a vastly different meaning to the phrase.

Nits and Picks

In previous chapters, various pet peeves were presented that can now be re-visited. They are simple and direct elements of writing that get in the way of effective communication. These nits and picks can be expressed as one-liners. Note that this list is not exhaustive.

• Be efficient in your language and where one word can be used to replace a phrase, do it.

• If the subject of the sentence is *there, here, it, they,* consider replacing it with a specific subject.

• Take care in using adjectives and adverbs, which work well in narrative writing but become alarmist in academic writing.

• Avoid obvious redundancies when adjectives and adverbs repeat the noun or verb, respectively (e.g., total collapse, complete confound, immediate spontaneity, personal opinion, each and every, etc.).

• Be careful of using jargon. Rather, use academic language (slightly more proper) not colloquialisms or informal language but keep it straightforward and not used to sound sophisticated.

• "Keep set transitional words like *however* to a minimum and make them as unobtrusive as possible by burying them inside sentences" (Cook, 1985, p. 28).

• Do not confuse *since* (which implies time) with *because* (which implies cause and effect).

• *Data* are plural.

• *That* is definite and *which* is indefinite.

• Do not use redundant adjectives like "kind of."

• On occasion, numbers can be useful in directing the flow and can tighten arguments with a range of numerical values. It is helpful for the reader to see numbers used in writing because it stands out so be as specific as possible.

• Be careful when using words "significantly" or "statistical significance."

The APA Patrol: The Final Three Components

The last three additions to your paper should reflect the entire synthesis. The title page is the most vital component because it tells a story. It should provide the jumping off for the entire synthesis and lead the reader into your paper, full of anticipation (remember McLuhan's definition of reading and guessing)? The abstract should simply add to the possibilities of anticipation, providing a sweeping 'quick read' of your entire paper. Of course, because this is just a proposal (with no results), it is important to simply interject results as you think they might occur, allowing you to write a full abstract but one that needs to be modified once you have conducted your study. Finally, ensure your references are complete and accurate. Sophisticated readers can interpolate your story by simply sweeping through them, attending to authors, dates, journals, all of which represent a shorthand to your story.

Title Page. The most critical issue to address is simply APA standards. According to the zAmerican Psychological Association (2020), 7th edition, the title page should be double spaced, Times New Roman 12 font; the words should be centered, and important words should be capitalized. The title page should also include a running head (placed in the left header) and the page numbers (placed in the right header). Typical order of the title page is title of study, author(s), affiliation, course (optional), instructor(s), and date. Otherwise, the only other consideration is the story it anticipates, and the terms used to distill the paper. Although it should be more than a brief 2-3word title, it also should not be more than 10-12 words. The critical question is to extract words from your synthesis that can be used to direct not only what you are

studying but why. Title page examples and templates: https://www.simplypsychology.org/apa-title-page.html

Abstract. By now, write the abstract as a first draft (that eventually is adjusted with content from your methods section, as well as issues anticipated in your discussion). This component of the paper needs to be added last because it needs to encapsulate in a brief 250 words (or less), the gist of your synthesis. Because it is so brief, it is unlikely to tell the story, but it should set up the story line. The abstract at this point, "is a short statement that describes a much longer piece of writing or a prospective conference presentation. Abstracts for research papers or theses should provide the reader with a quick overview of the entire study and can address the importance of the topic and/or reference to the current literature and/or identification of a knowledge gap" (Morley, 2021, pp 128-129). Realize, however, that it is early in writing the abstract and that you might switch a few topics, which then change the structure.

Your abstract should be a hook, an interesting prelude to your paper. The purpose of your abstract is for readers to decide the relevance of the paper for their own research, and to share key findings for the readers who chose not to read the entire paper. It should answer the following questions: What and why is the problem? What has been done by you (including participants and methods)? What was discovered in the process (share results and data analysis)? And finally, what does the discovery mean (discussion and implications for future)?

Four things to keep in mind when organizing an abstract is to begin on a new page, have a running head on the left side, have the actual "Abstract" bolded title, and page number on the right side. You may also want to include a few keywords; this should be done under the italicized heading (*Keywords)* and needs to be indented. The purpose of this part is for other researchers to identify your paper in databases after you have published. Abstract examples and templates: https://www.simplypsychology.org/abstract.html

References. The last component of your synthesis is the reference section. Two important considerations are **accuracy** in presence and **style** (using APA guidelines). The reason it is last is that between various dips into your primary resources and free writing concatenations, references can go missing. Accuracy in presence can be viewed from two perspectives:

1. Are references used in the text but missing from the reference list? This problem is the easiest to address and can be answered by simply reading your paper and, when a reference is used in the text, check it off on the reference list.
2. Are references in the final list present, but not used in the text? This problem is a bit more difficult to address because the entire text needs to be reviewed by going through the reference list as the primary source. The easiest strategy is to copy and paste a name and use the 'Find' function in the word processor. Once found, it can be highlighted a specific color. Then, in reading the paper one final time, any unhighlighted references can be removed.

Note that the former inaccuracy is the most obvious for any committee member and must be avoided at all costs. For the sake of precision, however, the latter inaccuracy should not be ignored.

Rules for references differ from each other based on reference type, whether it be book, journal, or website. It also has different rules for the number of authors, below are some helpful sources on guidelines.

https://www.simplypsychology.org/apa-reference-page.html

https://www.scribbr.com/category/apa-style/

https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/reference_list_electronic_sources.html

Summary of Final Flight Check

This chapter summarized the most important components of the final flight check. Much like a pilot of a major airplane, each final step needs to be explicitly and sequentially addressed. The *coherence* of empiricism is the most important. Nevertheless, it is carried through language that also needs to be engaging, elegant, and efficient. These latter traits are present in the title and abstract. This empiricism is also based on credibility and accuracy, which is particularly visible in compliance with APA guidelines. In the end, empirical credibility rides on the shoulders of others who can be viewed in the reference section.

As the final check, take a 10,000 foot elevation review of page breaks, margins, font type and size, paragraph spacing (above and below), table titles (2 rows with first word capped and a period presented above the table) and figure titles (all words capped, no period, and presented below the figure), headers and footers with page numbers, pages with the remains of a previous paragraph displayed at the top (and thus perhaps needing to be slightly reduced or a page break inserted somewhere in the paragraph), proper position of acknowledgements and notes, and finally, a triple check made by transforming the document into a portable device file (PDF) which locks in all of the features.

Writing is a sequential process and in English at least is from left to right. Ideas are developed incrementally but judgments are made holistically. The hand off between the two needs to hide somewhere on a continuum of explicit to implicit. The former style is easy to follow but can become boring, with the reader tethered to structure and focused on the road signs. The latter can lead to creative plays on language that allow the reader to look over the landscape and appreciate the beauty of words but forget the argument. If the argument is complex, sum up one section before moving on to another, avoid repetition, and enrich your vocabulary.

An important footnote: Now is the time to pull the paragraphs out of single space that are written with a blank line before and after. Though this strategy might have served its purpose in structuring and editing your paper, it is not APA compliant. Once this step is completed, the paper may need one final check to ensure perfect formatting with page breaks not separating tables or figures as well as dangling paragraphs with but one line trailing on the next page.

Appendix A – Final Flight Check

Appendix B – Write Right Now Prompt, Concepts/Vocabulary, and Response

Appendix C – Assignment 9

Appendix D – Assignment 9 Review Guide

Book References

American Psychological Association. (2020). *Publication manual* (7th ed.). Washington, DC: Author.

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Truss, L. (2003). *Eats, shoots, & leaves: The zero tolerance approach to punctuation*. New York: Avery - The Penguin Publishing Group.

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Appendix A – Final Flight Check

Ralph Butcher (undated), writing for the Aircraft Owners and Pilots Association, described pilot flight checks as critically important. "Traditionally, written checklists are designed to be carried out from beginning to end all at once. Segmented checklists, however, are constructed so that specific segments are completed at appropriate times. This yields operational flexibility, making it more convenient to use the checklist. The before-takeoff and before-landing checklists adapt well to this concept" (https://www.aopa.org/training-and-safety/students/presolo/skills/before-takeoff-checklist).[1]

The same is true for final drafts of papers. Typically, papers have been written in stages or phases. Indeed, in this book, topics addressed various sections for completing a literature synthesis that began with searching through important databases with key words, reviewing these papers quickly to connect them together (synthesize not summarize) using tables or theories (or both), framing an argument, structuring the various components of this argument (claims, evidence and warrants), using transition devices in clever ways to carry the reader through the paper, landing the introduction and conclusion as book ends, and finally writing a method and discussion section in anticipation of a final proposal (and collection/analysis of data). It is quite likely that the handshake among these various sections could be improved.

Therefore, the last step is to read the paper holistically, with all the sum of the parts at least equal to, if not greater, than the whole. This final flight check can be segmented as with pilots, distinguishing between taking off and landing). The most critical junctures are obvious: First, a title page (with a header) and abstract (with key words) need to be effectively written to frame the entirety of the synthesis. Second, the structure and flow of the paper needs to be smooth, primarily in a clear argument that effectively uses headings so the reader can use them as cliff notes to quickly see the logic of content as it plays out in sequence. Third, the language itself needs to be compelling and dole out information in paragraphs that draw the reader along, from initial interpretations to eventual understanding. Fourth, the references must be authoritative (both conceptually and empirically) and sweeping (in time as well as type). The fifth and final check point is the lack of grammatical errors and misspellings. This last step is rendered much easier with the use software, but one last check is critical, given the nuances of the English language and its lack of consistency.

Although word processors save time and make editing easy (with track changes), one last quick read often needs to be made (with no track changes). And as a final submission, the paper can be saved as a PDF which makes it less vulnerable in sending to others via email while also using different computers (and operating systems).

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[1] https://www.freeimages.com/photo/airplane-1307220

Appendix B – Write Right Now Prompt, Concepts/Vocabulary, and Response

Prompt

Concatenate all sections of your paper into a single document and double check that is perfect.

Concepts/Vocabulary

Abstract, Adjectives, Adverbs, Arguments, Authors, Claims, Evidence, Figures, Headers, Headings, Key words, Lay Out, Margins, Nouns, Paragraphs, Pagination, Punctuation, References, Sentences, Subject, Tables, Title, Transitions, Verb, Warrants

Response

I plan to read the paper over with no track changes and checked for the structure of the argument, the use of headers, and the use of active language with varied sentences. I also plan to assemble a list of transition devices used to carry the story. Finally, I want to ensure the sentences have the verb presented early (and without strong adverbs) and that the nouns avoid strong adjectives.

When I am done reviewing the content of the paper, I will double check that the title page effectively oriented the reader to the big idea for my synthesis and that the abstract communicates an overview. I also will check the reference section for accuracy. Finally, the layout of the paper will be quickly reviewed for page breaks, margins, and cut-off sentences.

Appendix C – Assignment 9

Appendix D – Assignment 9 Review Guide

<u>Integrate</u> all three sections of your Introduction, Method, Discussion (IMd) together with a cover page, abstract, body of the paper (including Method and Discussion) and list of references.

The focus is on the whole paper using the standards from the (American Psychological Association, 2020).

Is the title page properly formatted?

Is the abstract present and professionally written?

Is the running head present and proper?

Is the paper paginated properly with no paragraphs hanging inappropriately?

Are the headings nested in the proper format (Level 1, 2, 3, 4)?

Are the references in the text correctly formatted?

Are the references at the end of the paper correctly formatted?

Are tables and figures (if present) properly formatted?

Is an active voice used?

Are descriptions of people appropriately described?

Assignment References

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing* (7th ed.). Washington, DC: American Educational Research Association.