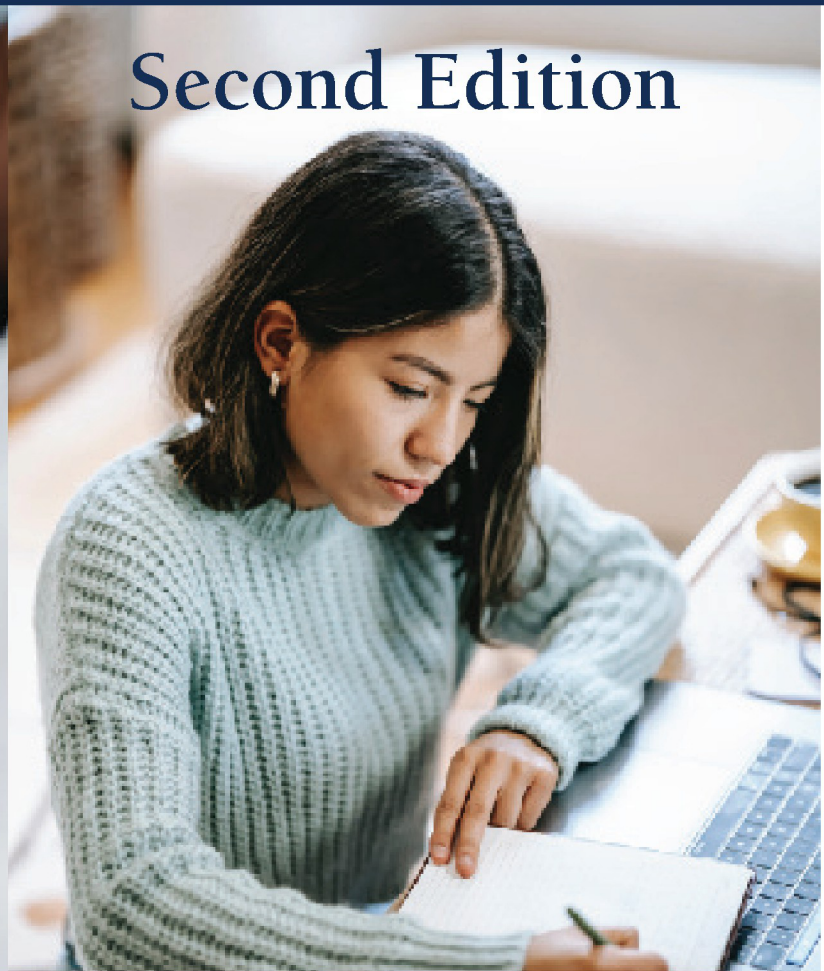


Preparing *to* Publish

Second Edition



Elena Cotos, Sarah Huffman, *and* Kimberly Becker

IOWA STATE UNIVERSITY

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Preparing to Publish, 2nd Edition

Elena Cotos; Sarah Huffman; and Kimberly Becker

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Iowa State University is located on the ancestral lands and territory of the Baxoje (bah-kbo-dzbe), or Ioway Nation. The United States obtained the land from the Meskwaki and Sauk nations in the Treaty of 1842. We wish to recognize our obligations to this land and to the people who took care of it, as well as to the 17,000 Native people who live in Iowa today.

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INTRODUCTION

Preparing to Publish is an e-book that guides users into the world of research manuscript publication. The primary audience is novice research writers and those who instruct them. The materials here build upon a tradition of English for Academic Purposes to provide clear guides to writing research drafts. The text explores the communicative goals, strategies, and language features associated with successful research writing and demonstrates the relationships between the sections of an empirical research article.

This e-book can be an important resource to novice research writers seeking to navigate the planning and development of their research drafts. It will provide them with enriching, interactive support that guides them through identifying functions of the research article as a whole and exploring authors' meaning as they write each research section. The e-book will also supply the novice research writers with techniques for understanding research writing within their individual disciplines and yield helpful tips for planning, drafting, and reviewing their own research drafts.

Additionally, all academics who provide novice researchers with writing support can use this e-book as a valuable reference resource for increasing understanding of published research writing norms. It can be used within a graduate-level class in any number of academic disciplines and/or suggested as a useful pedagogical resource for students to consult as they learn the mandatory components of research manuscripts. Alongside research section-specific instructional materials are real-world examples of the building blocks that make up the writing. These samples are derived from a range of authentic, published research articles from highly reputable peer-reviewed journals and were hand-selected by field-specific experts in varying academic programs.

It is our hope that all featured goals, strategies, sentence starters, interactive activities, planning tools, and tips in the chapters support all who seek to advance their understanding of research writing conventions and publication expectations. The chapters of this e-book are organized as follows:

- Chapter 1: Goals and Strategies of a Research Article
- Chapter 2: Writing the Introduction
- Chapter 3: Writing the Methods
- Chapter 4: Writing the Results
- Chapter 5: Writing the Discussion/Conclusion
- Chapter 6: Writing the Abstract
- Chapter 7: Preparing to Publish

ORGANIZATION OF THIS BOOK

Prior to delving into this e-book's chapters, it is helpful to know how it is organized and how to best use the instructional content and featured activities. In each chapter, we present detailed descriptions of the research article sections, including the main goals authors aim to achieve in each section, the strategies intentionally applied to achieve those goals, and the common language choices they make when employing the strategies. To supplement these descriptions, we include five different callout boxes for 1) *learning objectives*, 2) *warm-ups*, 3) *examples*, 4) *explore & apply*, and 5) *key takeaways*.



Learning Objectives

“Learning Objectives” presents the intent of each chapter in this e-book. They are typically located at the start of every chapter to orient writers to what they will have learned after completing the given chapter.



Warm-Up

“Warm-up” offers interactive tasks, such as questions about observations of writing in a particular discipline or short activities prompting reflection on the writing process. This feature primes writers to engage with the upcoming material in ways that are most relevant to them and their field.



Examples

“Examples” provides real-world examples of the content being described. These examples are derived from actual peer-reviewed research publications in a variety of different disciplines and are intended to better illustrate the instructional material in the particular research article section covered.



Explore + Apply

“Explore & Apply” encourages writers to investigate the writing conventions of their own discipline. Specific tasks ask them to explore quality published research in their field so they can better match the goals and strategies instructed in the chapter with what they observe occurring in that writing. Next, we provide suggestions for how to apply these goals and strategies as writers construct their own research drafts.



Key Takeaways

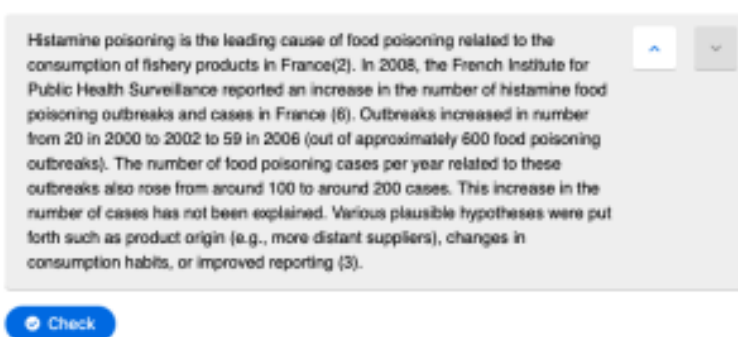
“Key Takeaways” supply writers with a quick summary of the overall message of each chapter. They can serve as a useful thumbnail to remind the e-book’s readers about what content is provided in that chapter.

NOTE TO STUDENTS

Dear students,

It is our pleasure to provide you this informative, interactive e-book at no cost to support you in navigating empirical research writing and publication. This e-book will help you identify the goals and strategies of each research article section as well as explore “real” examples from peer-reviewed research publications. Additionally, it will provide you with strategies for understanding research writing from different disciplines and yield helpful tips for planning, outlining, drafting, and reviewing each research article section. The e-book features eight chapters that we believe to be instrumental for understanding and developing the sections. For a more in-depth discussion of copyright, author permission, research integrity, see *Surviving Research Publication*.¹

We present the chapters of this book according to the chronology of the research article to ensure mastery of research writing basics prior to exploring the specifics of each research section. However, we encourage you to choose your own path through these chapters as needed, especially after mastering the elemental goals and strategies. For example, those seeking to develop a draft of their Methods can consult the various materials included in *Chapter 3: Writing the Methods*. We also encourage you to use the *Contents* menu for quick access and navigation to the chapters. To help you better engage with the materials, we have included several interactive activities so you can check your knowledge, deepen your understanding, and receive targeted feedback. Examples of these interactive activities are *Multiple Choice Sets*, *Essay Questions*, and *Planning Tools*. You will see each activity in a box with a “**Check**” button for submitting responses.



1. Compton, Lily, et al. *Surviving Research Publication*. Iowa State University Digital Press, 2026, <https://doi:10.31274/isudp.2026.216>.

Histamine poisoning is the leading cause of food poisoning related to the consumption of fishery products in France(2). In 2006, the French Institute for Public Health Surveillance reported an increase in the number of histamine food poisoning outbreaks and cases in France (6). Outbreaks increased in number from 20 in 2000 to 2002 to 59 in 2006 (out of approximately 600 food poisoning outbreaks). The number of food poisoning cases per year related to these outbreaks also rose from around 100 to around 200 cases. This increase in the number of cases has not been explained. Various plausible hypotheses were put forth such as product origin (e.g., more distant suppliers), changes in consumption habits, or improved reporting (3).

  1/4 [Show solution](#) [Retry](#)

After completing each activity, you will receive instant feedback. You will also see two buttons: “**Show Solution**” for showing exemplary responses and “**Retry**” for re-doing the activity. We encourage you to access the online version of this book or the downloadable version from a device connected to the internet so you can complete these interactive tasks. We created them intentionally to increase your familiarity with published research writing conventions. Your recognition of what makes quality research writing in your field will help you as you craft your own research article sections and assist greatly with your progress in becoming an independent, confident research writer.

We hope these chapters help you draft your research with more ease, more intention, and less confusion about the type of writing you are expected to produce at this advanced academic level.

Best,

Sarah Huffman, Ph.D., Elena Cotos, Ph.D., and Kimberly Becker, Ph.D.

NOTE TO INSTRUCTORS

Dear instructors,

It is our pleasure to present this interactive open educational resource on the writing and publication of empirical research articles. This resource features seven chapters that guide students through the different stages of developing research article drafts, from understanding the basics of scientific arguments to applying goals, strategies, and language conventions of every research article section.

In each chapter, your students will be engaged in (1) completing warm-up activities to help them reflect on their own writing processes, (2) understanding detailed descriptions of instructed content, (3) observing real-world examples of the building blocks that make up research writing, (4) exploring published writing in their own fields to understand published authors' use of certain research article section-specific goals, strategies, and language features, and (5) applying these concepts to successfully compose their own research article drafts. For a more in-depth discussion of copyright, author permission, research integrity, see *Surviving Research Publication*.¹

To increase engagement with the content, each chapter provides students with several interactive activities, like 'Essay Questions' and 'Multiple Choice Sets'. These activities aim to support student writers in checking their understanding and receiving immediate feedback targeted to their needs. To make the most of these activities, we recommend integrating them into your course management system or instructional platform to support your research writers in their learning journey. We designed these activities purposefully to increase their recognition of what makes quality research writing in their fields and to accelerate their growth in becoming independent research writers.

We hope your students find this resource enriching and helpful in guiding them through the research writing and publication processes.

Best,

Sarah Huffman, Ph.D., Elena Cotos, Ph.D., and Kimberly Becker, Ph.D.

1. Compton, Lily, et al. *Surviving Research Publication*. Iowa State University Digital Press, 2026, <https://doi.org/10.31274/isudp.2026.216>.

ACCESSIBILITY STATEMENT

We are committed to making all chapters in this e-book accessible to all users. We have, thus, designed each chapter page with careful consideration of technology adoption and accessibility standards. Users can access every chapter of this book online as well as in three other formats (EPUB and Digital PDF) from the [DOI landing page](#). We recommend accessing the chapters from a device with an internet connection to enable viewing and instant engagement with the interactive activities and embedded content. Other accessibility considerations we employed are:

- All chapters are designed to work with screen-reader technology;
- All content is not conveyed only by color;
- All visual elements are provided with alternative text;
- All content is grouped under headings and subheadings;
- All featured sections are marked by callout boxes and icons (e.g., warm-up, examples, key takeaways, explore & apply).

Additionally, we followed the guidelines published by “[Accessibility Toolkit – 2nd Edition](#)” of BCcampus. We hope these considerations make this e-book accessible to as many users as possible. Please contact us for questions or issues accessing the chapters of this e-book at shuffman@iastate.edu.

CHAPTER 1: GOALS AND STRATEGIES OF A RESEARCH ARTICLE



Learning Objectives

After completing this chapter, you should be able to:

- Distinguish between empirical and non-empirical research articles.
- Explain the standard organization of empirical research articles.
- Evaluate the organizational pattern in terms of general vs. specific information.
- Recognize the structure of empirical research articles.
- Apply knowledge of the structure to understand basic communicative goals and strategies.

RESEARCH AND RESEARCH ARGUMENTS

What is Research?

The word *research* is simple and yet, at the same time, quite complex. It can be a noun or a verb (as seen below in the dictionary definitions), and yet we complicate it further by introducing the idea that different academic disciplines consider research from a variety of perspectives.

Research / r ɪ 'sɜrtʃ , 'ri sɜrtʃ /

- **noun:** (a) diligent and systematic inquiry or investigation into a subject in order to discover or revise facts, theories, applications, etc.: recent *research* in medicine. (b) a particular instance or piece of *research*.
- **verb (used without object):** to investigate carefully.
- **verb (used with object):** to make an extensive investigation into; to *research* a matter thoroughly.

What is a Research Argument?

When we think of the word “argument,” we often envision a disagreement between two or more parties. In research, the “argument” refers more exclusively to the case you are building and for which you have supporting information to strengthen that case. In research writing, you construct an argument about the legitimacy, value, and reliability of the research you have conducted. The more robust your supporting data and more well-crafted and better reasoned the interpretations of your results are, the more you will convince your audience of the acceptability of your argument.

What is a research argument in the context of scholarly

writing?

- a claim backed (warranted) by evidence
- not a heated disagreement

The concept of the argument can be applied to any part of the empirical research write-up, from the entire article or thesis or dissertation down to each individual sentence (Cargill & O'Connor, 2009)¹. For this reason, it is important that research writers are intentional about what argument they want to make (or what they aim to convince their audience of) before they begin writing; this will shape not only each sentence, but also the text as a whole.

How do I Develop a Research Argument?

In earlier stages of developing our argument, it is of utmost importance to ask ourselves several questions that are central to the research. These questions can be instrumental in determining whether our argument is scientific and can be convincing to our disciplinary research community.

Developing a research argument:

- What is the issue I want to investigate?
- Why is it important to solve this issue?
- How can I solve this issue?
- What is my approach to solving this issue?
- What implication does solving the issue offer to my field?

After answering these questions, it is helpful to consult experts to validate our rationale and obtain feedback.

1. Cargill, M. & O'Connor, P. (2009). *Writing scientific research articles: Strategies and steps*.

These experts have been long immersed in our disciplinary scientific communities, and their judgment on whether our choices are appropriate for the argument can direct us as we conduct and write up our research.



Warm-Up

Consider these questions as you prepare to read:

1. What does a research argument focus on?
2. How can we devise with a research argument?
3. How can we know that our argument is appropriate for a research study?

SECTIONS OF A RESEARCH ARTICLE

Research Article Sections

You are probably familiar with some of the sections included in a typical research article, but if not, you are in the right place! The first step in learning about how to write up research is understanding the organizational structure of a research article. Research articles typically have four primary sections following an **I-M-R-D** order:

1. **I**ntroduction
2. **M**ethods
3. **R**esult
4. **D**iscussion/Conclusion

The figure below shows an hourglass that visualizes this organizational structure. The hourglass helps us envision the relationships between each of the IMRD/C sections, demonstrating the *generality* of the **Introduction** and the **Discussion/Conclusion** sections in contrast to the more *specific* nature of the **Methods** and **Results** sections. We start from a broad, general perspective in the Introduction section. Then, as we move toward the middle of our research article, our content becomes increasingly more specific, with the focus narrowing to the current research Methods and Results. Finally, the scope broadens again in the Discussion/Conclusion section as the author makes meaning of their findings and addresses implications for research and practice.

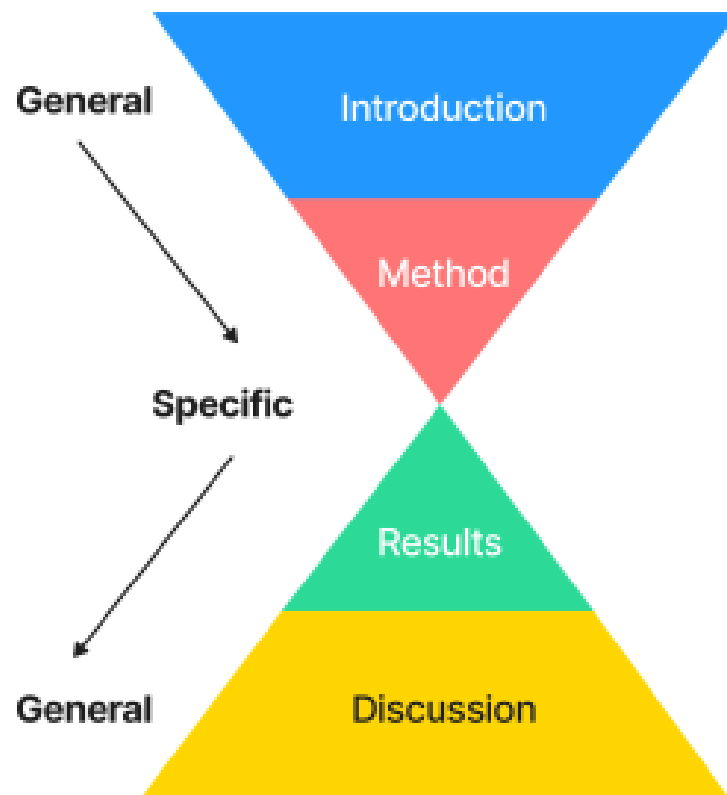


Figure 5. Research articles start general and get specific before becoming general again

Naming the Sections

Depending on the discipline or journal, it is important to highlight that these research article section headings can vary. We thus recommend exploring research articles in your discipline so you can identify how writers frequently title their sections. Below are the generic headings matched with other common alternatives that research writers may use:

Generic headings	Other common generic headings
Introduction	Background / Literature Review / Theoretical Framework / etc.
Methods	The Study / Material and Methods / Methodology / Research Methods / etc.
Results	Findings / Results and Discussion / etc.
Discussion/Conclusion	Discussion / Discussion and Implications / Conclusion / Conclusion and Recommendation / Conclusion and Future Lines of Research / etc.

Research Article Section Purpose

In this e-book, we will focus on helping you master each research article section with its specific functional and linguistic characteristics. In addition to the four main sections, the **Abstract** might also be considered an official section. With that in mind, please take a closer look at the figure below to start thinking about the functional purpose of each section.

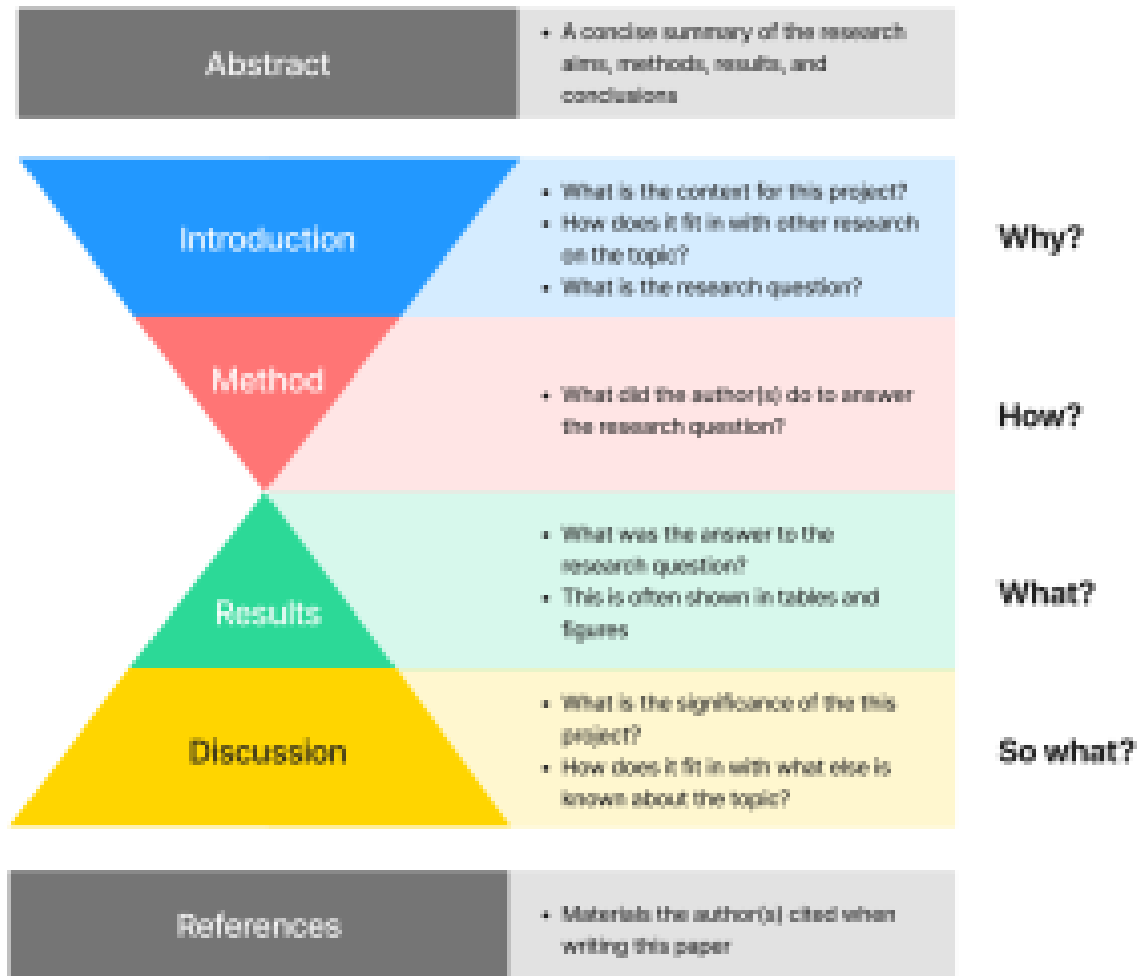


Figure 6. Important questions to address in each section of the research article



Explore + Apply

Select several published research articles in your discipline and closely examine them with the following questions in mind:

- Do your articles follow the IMRD/C structure?
- Do your articles have a combined Results/Discussion section? Or a stand-alone Results section?
- What type of headings and sub-headings are used for the sections?

GOALS AND STRATEGIES OF A RESEARCH ARTICLE

How to Write Research Sections

This section will introduce you to the concepts of goals and strategies, terms we use throughout the book as a way to guide your understanding of how effective research writers intentionally build up their research argument:

Goals

Goals are the functional aims, purposes, and objectives of a section. Goals are accomplished via phrases, sentences, and even whole paragraphs. This means that each section of a research article is written to communicate information that achieves specific goals that the reader expects.

Strategies

Strategies are the different techniques a writer can use to accomplish goals of a research article section. We can think of strategies as options for accomplishing a particular goal.

The terms *goals* and *strategies* were introduced to writing pedagogy following the pioneering work of Swales (1981¹; 1990²), who conducted empirical investigations on the structure of research articles from different academic disciplines.

There is rich evidence on how each **IMRD** section carries its own functional purpose and, therefore, is governed by its own goals and strategies.

1. Swales, J. M. (1981). Aspects of article introductions. *ESP monograph*. Birmingham: The University of Aston Language Studies Unit.

2. Swales, J. M. (1990). *Genre analysis: English in academic and research settings*. Cambridge: Cambridge University Press.

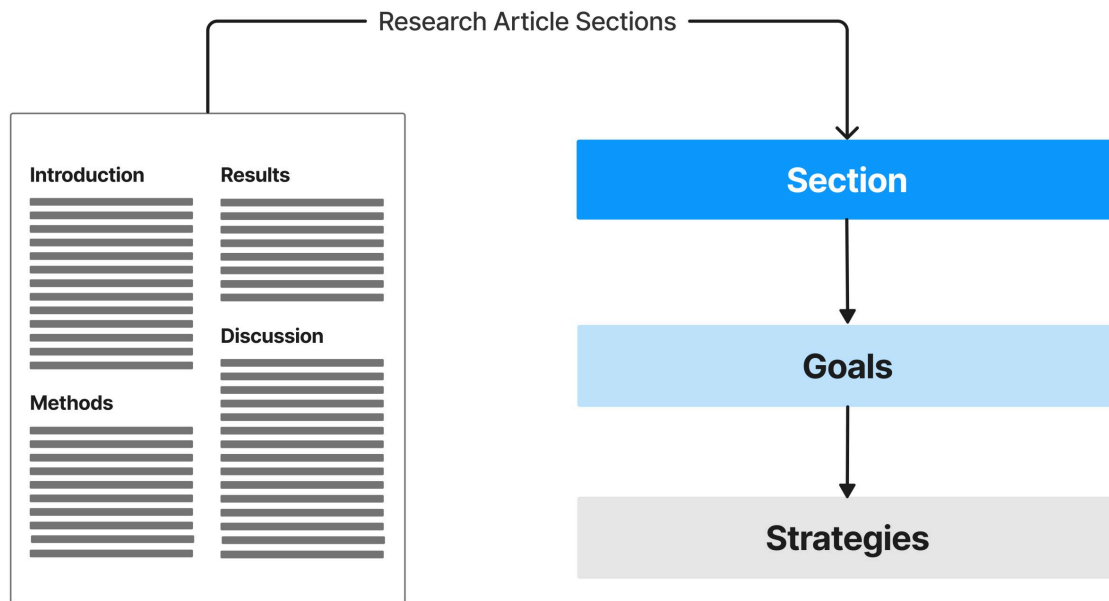
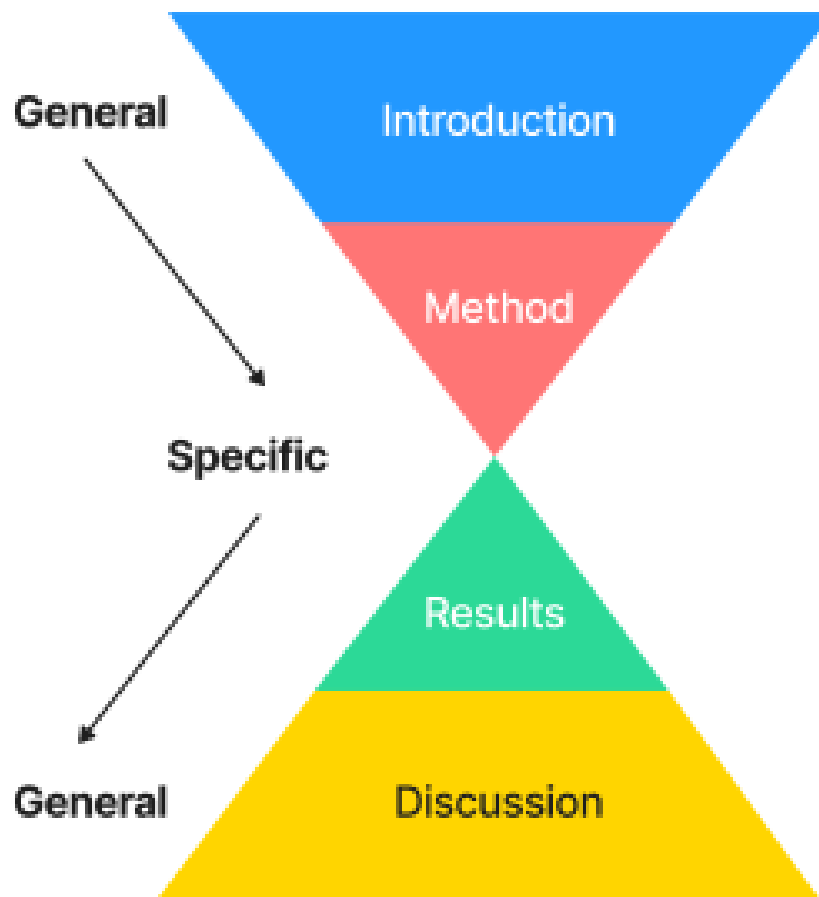


Figure 4. The goals and strategies of each research article section

SUMMARY

This chapter outlined the organizational structure of an empirical research article, which is commonly referred to as IMRD/C. Each of those sections has specific goals and strategies that expert writers use to communicate their research successfully. To understand their writing practices, we use the image of an hourglass to help us envision the relationships between these IMRD/C sections. This hourglass illustrates the specific scope of the Methods and the Results sections in contrast to the generality of the Introduction and the Discussion/Conclusion sections. In the following chapters, we will learn about each of the sections in more detail.





Key Takeaways

Each empirical research article contains distinct sections that tend to be rather consistent across disciplines, but could have some individual variation within the discipline or the journals. The argument in an overall research article moves from being general to specific then back to more general again.

Review



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=157#h5p-9>

CHAPTER 2: WRITING THE INTRODUCTION



Learning Objectives

After completing this chapter, you should be able to:

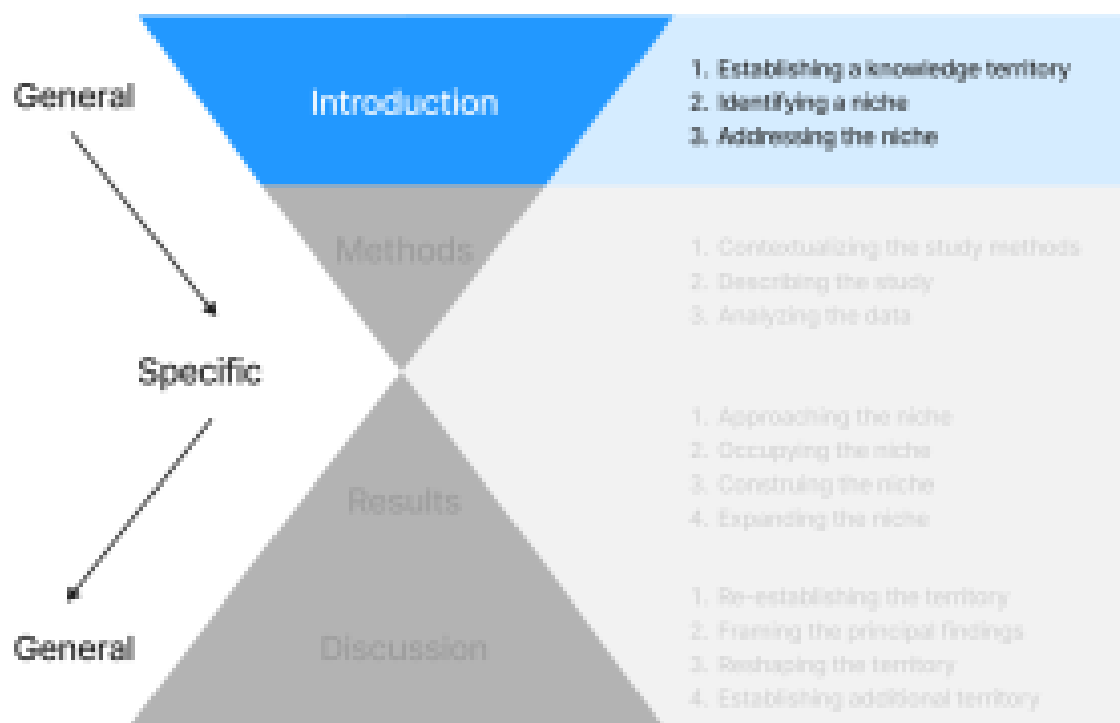
- Articulate the importance of the introduction section and its components.
- Recognize the three communicative goals that researchers compose their introduction to achieve.
- Apply strategies to achieve each of the three communicative goals.
- Optimize the language for communicating the strategies.
- Evaluate your research introduction section.

GOALS OF THE INTRODUCTION SECTION

The first section of a research article is the **Introduction**. Compared with other sections, the Introduction is one of the most general sections of the entire article. Writers provide us with a broad picture so that we can understand the research topic's context within the discipline, the value it brings, and how it fits in within the field. Writers of the Introduction section move from general to specific framing to communicate their content. To do this, they use **communicative goals** to ensure that they communicate their content in an effective way. These communicative goals are:

1. **Establishing a knowledge territory**
2. **Identifying a niche**
3. **Addressing the niche**

These goals attempt to explain to orient the reader then present a case for why the current research is needed:



As you can see in the hourglass figure above, the Introduction becomes more specific as it progresses.

Establishing a territory will narrow down into identifying a research niche, and identifying a research niche will further narrow into addressing the research niche. The narrowing of the research argument allows for increasingly more specific ideas that target the exact research study.

It is important to note that writers employ these goals in different sections or sub-sections, which could be titled as “Introduction,” “Background Information,” and “Literature Review,” to name a few. Research writers typically follow their discipline’s and journal’s conventional writing standards to determine how to organize these goals, how long every goal should be, and what language best expresses each goal of the Introduction.

In the following pages of this chapter, we’ll examine each of these three goals in depth and supply examples from different disciplines and academic journals.



Warm-Up

- What types of information does the reader expect to see in the Introduction section?
- How many communicative goals are there in the Introduction section?

INTRODUCTION GOAL 1: ESTABLISHING A KNOWLEDGE TERRITORY

The first goal of writing an Introduction **Establishing a Knowledge Territory**, which means that you explain to your reader the big picture of where your study fits in the literature. Goal 1 prepares your reader to understand your research better by describing what is generally known and what has been previously researched. Imagine Goal 1 as the foundation upon which you are going to build the house of your research. There are three **strategies** that will help you to accomplish this:

Introduction

Establishing a knowledge territory

- Claiming centrality
- Providing general background
- Reviewing previous research

Identifying a niche

Addressing the niche

Overall, Goal 1 is the broadest part of an Introduction, so as you are writing, be sure to keep the information general. We'll now discuss each of these strategies and provide some examples from published journal articles.

Goal 1: Establishing a Research Territory

Claiming Centrality

The strategy of **claiming centrality** is used to focus the reader's attention on the reasons that your research belongs within the bigger picture of the topic. Centrality is also about stating the importance of your study and/or the amount of attention that other scholars have paid to the issue. You can implement this strategy by pointing out the broader scope of interest and noting other investigations that are related. This highlights the significance of your claims and shows the study has the potential for prominence within your discipline.

Here are two examples taken from published research articles in different disciplines. These excerpts demonstrate how to claim that there is a considerable amount of interest in and importance associated with the topics, and the key language is in bold.



Examples

- Meat tenderness **is an important issue** in beef cattle **because it has a major impact on** consumer satisfaction. However, beef meat quality is not routinely measured, so a classical selection based on records is not feasible.¹
- The emission from low-mass X-ray binaries in quiescence (qLMXBs) **is routinely studied to provide useful constraints on** the physical models of the interior of neutron stars (NSs). The low luminosity (1032-1033 erg s⁻¹, 4-5 orders of magnitude lower than the outburst luminosities) of these objects was first observed in the post-outburst stages of the transient LMXBs Cen X-4 and Aql X-1 (van Paradijs et al. 1987), and initially interpreted as a thermal blackbody emission powered by some low-level mass accretion onto the NS surface (Verbunt et al. 1994).²

Claiming centrality generally occurs quite early in an Introduction because of its ability to establish the territory for the remainder of the Introduction. You will often see this strategy as the very first sentence of a paper; however, it is important to remember that strategies do not occur in a set order. That is, writers can use them wherever the strategies seem most useful or relevant in a given Introduction.

Some common vocabulary that is associated with this strategy includes the following, as noted in the [Academic Phrasebank](#) website:

pivotal

focal

fundamental

1. Ilais, S., Journaux, L., Levéziel, H., Payet-Duprat, N., Raynaud, P., Hocquette, J., Lepetit, J., Rousset, S., Denoyelle, C., Bernard-Capel, C. (2011). "Effects of polymorphisms in the calpastatin and μ -calpain genes on meat tenderness in 3 French beef breeds", *Journal of Animal Science* 89(1):1-11.

2. Guillot, S., Rutledge, R., Brown, E. (2011). "Neutron Star Radius Measurement with the Quiescent Low-mass X-ray Binary U24 in NGC 6397", *The Astrophysical Journal* 732(2):88.

instrumental	vital	critical
essential	potent	powerful
crucial	widely-used	extensive
growing	primary	requisite

Providing General Background

A second strategy for Establishing the Knowledge Territory is **providing general background**. This strategy usually combines a variety of different types of information, which may be related to theory, practice, methodology, or any other shared area of knowledge within the discipline. Academics use this strategy as a tool to position the research within a frame of reference to support the reader's understanding of the study.

Below you will read some examples of this strategy being used in published research. Notice how the writers are making general statements about their topics by using words adverbs, such as *usually*, *typically*, *commonly*, *generally*, or *mostly*, which serve to emphasize the general nature of the statements.



Examples

- The promotion system **is mainly concerned with** the regulation of desired outcomes-people operating under a promotion focus are oriented toward opportunities and accomplishing aspired goals and **generally engage in** approach-related behaviors toward positive end states, such as acquiring or consuming desired objects.³
- As an opportunistic pathogen, *Candida albicans* is an important cause of systemic fungal infection in hospitalized patients. Routine detection of *C. albicans* in blood is time consuming and **typically involves** the use of blood cultures, followed by isolation on solid agar media. Definitive identification

3. Baas, M., De Dreu, C., Nijstad, B. (2011). "When prevention promotes creativity: the role of mood, regulatory focus, and regulatory closure.", *Journal of Personality and Social Psychology* 100(5):794.

of *C. albicans* via commercially available automated systems may require up to 48 h.⁴

Of course, it is not a requirement for there to be an adverb in a sentence whose purpose is to present general background. It is merely one way to accomplish the goal of Establishing the Knowledge Territory.

Reviewing Previous Research

Reviewing previous research is the third strategy a writer can utilize to establishing a research territory. This strategy acknowledges the many contributions of other scholars by synthesizing and criticizing previous research. We often call this section the *Literature Review*. This strategy provides a demonstration of expertise about a topic, supporting the reader's understanding, and expanding your ethos as an academic, which contributes to the credibility of your research.

Although this is probably the most well-known of the strategies within an Introduction, it is also one of the more varied in terms of the language resources we can exercise. Below are several examples from high-impact journals in two varied fields. Notice the variety of phrases the writers use to introduce previous literature.



Examples

- Recent increases in the prevalence of asthma and other allergic diseases **have prompted investigators to consider the role of** the environment in the genesis of atopy **(von Mutius, 2009; Horner, 2010)**. Modern public health practices have eliminated many of the microbial threats for humans.⁵

4. Bisha, B., Kim, H., Brehm-Stecher, B. (2011). "Improved DNA-FISH for cytometric detection of *Candida* spp", *Journal of Applied Microbiology* 110(4):881-892.

5. Wingender, G., Rogers, P., Batzer, G., Lee, M., Bai, D., Pei, B., Khurana, A., Kronenberg, M., Horner, A. (2011). "Invariant NKT cells are required for airway inflammation induced by environmental antigens", *The Journal of Experimental Medicine* 208(6):1151-1162.

- **Recent studies (e.g., Bartell, 2005; Bickmore & Bickmore, 2010; Britton, Paine, Pimm, & Raizen, 2003; Glazerman et al., 2009; Main, 2008; New Teacher Center, 2002; Piggot-Irvine, Aitken, Ritchie, Ferguson, & McGrath, 2009; Smith & Ingersoll, 2004) affirm that comprehensive induction comprises an array of aligned and integrated components which include: carefully selected and trained mentors; a curriculum of intensive and structured support and professional development opportunities; regular meetings with mentors; opportunities to observe experienced teachers; formative assessment tools that permit evaluation of practice; and outreach to wider educational support. We know also, from research by Carver and Feiman-Nemser (2009), that policy documentation which “sets conditions for how induction support is practiced by mentors, and experience by novices” (p. 314) is important, and that support should be provided across at least the first 2 years in the workplace.⁶**

Another important point to make about the actual language that a writer might consider using is that reporting verbs (words that directly quote someone else’s idea[s]) are extremely common in this strategy. Reporting verbs are quite nuanced and can provide not only a quote but also the writer’s stance towards that quote (i.e., supportive, doubtful, neutral, etc.). A number of frequent reporting verbs⁷⁸ are listed in the textbox below:

describe	demonstrate	explain
claim	mention	examine
argue	state	suggest
show	indicate	note
propose	use	find

6. Anthony, G., Haigh, M., Kane, R. (2011). “The power of the ‘object’ to influence teacher induction outcomes”, *Teaching and Teacher Education*, 27.

7. Bloch, J. (2010). A concordance-based study of the use of reporting verbs as rhetorical devices in academic papers. *Journal of Writing Research*, 2(2), 219–244.

8. Liardét, C., & Black, S. (2019). “So and so” says, states and argues: A corpus-assisted engagement analysis of reporting verbs. *Journal of Second Language Writing*, 44, 37-50.

Some other common language (noted in the box below) came from the [Academic Phrasebank's](#) section on “Referring to previous work to establish what is already known”:

- Studies of X show the importance of ...
- Several theories on the origin of X have been proposed.
- Extensive research has shown that ...
- It has previously been observed that ...
- Several attempts have been made to ...
- Studies over the past two decades have provided important information on ...
- Data from several studies suggest that ...
- Previous research has found ...
- The existing body of research on X suggests that ...
- There is a growing body of literature that recognizes...
- Recent evidence suggests that ...
- Surveys such as that conducted by X (1988) have shown that ...
- Factors found to be influencing X have been explored in several studies.
- Recent work has established that ...

Remember that each discipline has its own conventions for writing the Introduction and each author has their own personal writing style, there are still many similarities and patterns in the language used to accomplish the strategies in Establishing the Knowledge Territory. It is important you look to writing in your field to determine what language is appropriate to accomplish Goal 1 in your own Introduction section.

Review

Now, let's practice applying our knowledge of the first goal of the Introduction section.



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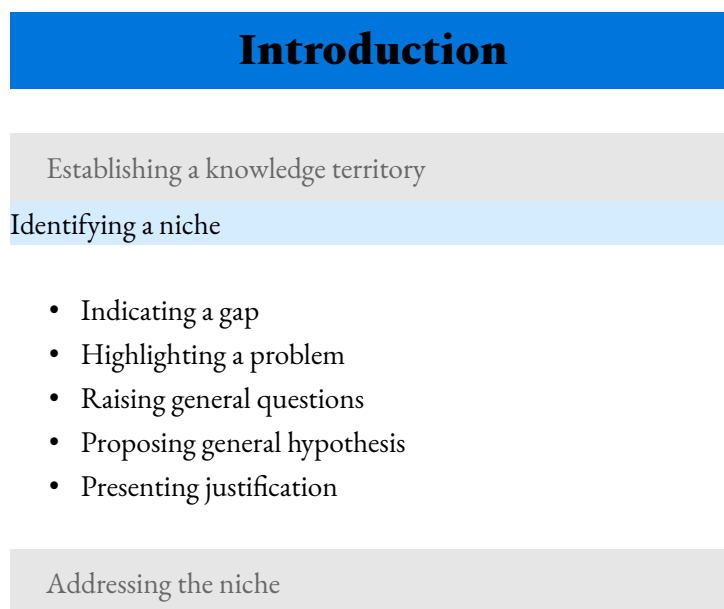
<https://iastate.pressbooks.pub/isudp-2026-252/?p=164#h5p-11>

This excerpt is from the Journal of Applied Engineering in Agriculture⁹.

9. Tumuluru, J., Sokhansanj, S., Lim, C., Bi, X., Lau, A., Melin, S., Oveisi, E., & Sowlati, T. (2010). Quality of wood pellets produced in British Columbia for export. *Applied Engineering in Agriculture*, 26(6).

INTRODUCTION GOAL 2: IDENTIFYING A NICHE

The second goal of an Introduction is to **Identify a Niche** or state the problem that your paper is trying to address. In doing this, you will call attention to an area of interest in the current research and specify weaknesses/drawbacks in existing studies. When you identify your niche, you have underscored a gap in some part of your field, and this gap is called your “niche.” Accomplishing this second goal gives you the opportunity to show where you intend to make your contribution to the discipline. It also allows you to narrow the focus of the paper from a more general focus to a more specific area of the field where there is the potential for more research (*your* research). Here are the main **strategies** that writers use to accomplish Goal 2 of the Introduction:



Authors generally utilize these strategies to further their critical analysis of previous research. After introducing the niche, the authors may choose to emphasize the need to address it by providing a justification; thus, an Introduction’s second goal usually begins with a word indicating that the following sentence is going to oppose or negate the previous sentence. Frequently, Goal 2 is initiated with words such as *however*, *nevertheless*, *yet*, *unfortunately*, *but*, etc. In addition, the function of Goal 2 can be expressed by the words/phrases:

- Negative or quasi-negative quantifiers: *no*, *little*, *none (of)*, *(very) few*, *neither*, *nor*
- Terminology of negation expressed by:

- verbs (e.g., *fail, lack, overlook*) and/or
- adjectives (e.g., *inconclusive, misleading, scarce, elusive, limited, questionable*) and/or
- nouns (e.g., *failure, limitation, gap, dearth, lack*) and/or
- adverbs (e.g., *rarely, scarcely, barely, hardly*)

Goal 2: Identifying a Niche

Indicating a Gap

Indicating a gap is the first possible way that authors can claim a lack of research on a certain topic or area. That is, this strategy reveals a gap in the targeted research trend that needs to be filled. You can use this strategy to underscore the unknown, show connections between what is known in the field and what requires investigation, demonstrate critical evaluation of the current general research topic, and possibly connect to the goals of the present study in implicit or explicit ways.

Now, let's examine some excerpts of what these strategic options look like in real, published manuscripts. Be on the lookout for the example language noted above.



Examples

- **Although** the specific purpose of adult neurogenesis is not entirely clear, there is evidence that it has major roles in adult neuroplasticity [1,2]. Ablating aNSCs through genetic manipulation in mice or by focal irradiation leads to deficits in hippocampus-dependent learning tasks [3,8].¹
- Adult attachment theory has made considerable progress in identifying different dimensions that produce distinctive affective responses. **A relatively unexplored issue** in attachment theory and research is the specificity or generality of affective reactivity to others' behavior. In other words, does an attachment orientation produce a generalized response to

1. Guo, W., Allan, A., Zong, R., Zhang, L., Johnson, E., Schaller, E., Murthy, A., Goggin, S., Eisch, A., Oostra, B. (2011). "Ablation of Fmrp in adult neural stem cells disrupts hippocampus-dependent learning," *Nature Medicine* 17(5):559-565.

others or does an attachment orientation produce responses that are specific to the kind of relationship?²

If you'd like to see more examples of language that you can use to signal the use of this strategy, the [Academic Phrasebank](#) is an excellent resource. Some of the sentence starters that are suggested there include the following:

- Previous studies of X have not dealt with ...
- Researchers have not treated X in much detail.
- Such approaches, however, have failed to address ...
- Previously published studies are limited to local surveys.
- Half of the studies evaluated failed to specify whether ...
- The existing accounts fail to resolve the contradiction between X and Y.
- However, much of the research up to now has been descriptive in nature ...

Highlighting a Problem

Highlighting a problem articulates a problem that needs to be solved or an area for improvement in the research area. You can use this strategy to signal an existing issue, raise a concern about the issue, demonstrate critical evaluation of the issue, and possibly connect to the goals of the present study. Consider the following examples of how authors use this strategy to highlight a problem existing in their particular niche.



Examples

- People's tendencies to project their own opinions can alter their judgments about what others think is ethical, perhaps giving them a sense of being in the majority even when they are not. **The ramifications of this false**

2. Sadikaj, G., Moskowitz, D., Zuroff, D., (2011). "Attachment-related affective dynamics: differential reactivity to others' interpersonal behavior.", *Journal of Personality and Social Psychology* 100(5):905.

consensus effect may be problematic: if members of organizations erroneously assume that their actions are in line with prevailing ethical principles, they may subsequently learn of their misjudgment when it is too late to avert the consequences. In the present research, we examine whether brokers in a social network show evidence of false consensus in ethical decision making.³

- **Unfortunately**, it is very easy to overfit a model to one particular dataset (Huang et al. 2003). **This situation would probably result in biased predictions** when the model is applied to other datasets. A **misspecification** of the model or a **poor** draw of training data from the population could also **lead to biased predictions**.⁴

Raising General Questions

Raising general questions is the third possible strategy. This is used to highlight questions about the current body of research on your topic. There are two ways to raise general questions: (1) asking a direct question (i.e., actually using a question mark) and/or (2) asking an indirect question (i.e., presenting the question in the form of a statement). It is important to realize that this strategy is related to questions about the *field*; these are *NOT* your specific research questions. Those will be discussed later. The following examples demonstrate how published writers raise general questions in their manuscripts:



Examples

- With such a large and rapid infrastructure development programme, decision makers must balance three key factors when deciding the nature

3. Flynn, F., Wiltermuth, S. (2010). "Who's with me? False consensus, brokerage, and ethical decision making in organizations", *Academy of Management Journal* 53(5):1074-1089.

4. aughn, N., Turnblom, E., Ritchie, M. (2010). "Bootstrap evaluation of a young Douglas-fir height growth model for the Pacific Northwest", *Forest Science* 56(6):592-602.

and characteristics of the treatment infrastructure developed: **what solution provides the best economic value?** ⁵

- **How can the process of dynamic evaluation be studied?** The issue of potential differences in judgment **raises the methodological question of** who is in the best position to rate in-progress artworks. It might be more ecologically valid to have artists rate their own emerging works; however, in that case there is no basis for validating artists' own judgments against those of external observers. ⁶

Proposing General Hypotheses

When writers **propose general hypotheses**, they are predicting future findings or implications. Note that this strategy — like the previous one — includes the word *general*. These are NOT the specific hypotheses that you might have about your research. So, in order to do this, you need to use language that indicates the hypothetical nature of your claims. For example, you could use a conditional statement (e.g., if X were Y, then it would affect Z) and/or words such as *may*, *might*, *likely*, *possible*, *expected*, etc. The following are examples of how you can implement this strategy:



Examples

- Many studies on antimicrobial peptides have been carried out in an effort to elucidate the cause for this selectivity. **One hypothesis is that** the highly anionic lipids (~30 mol %) (3, 4) in the cytoplasmic membranes of bacterial and fungal cells facilitate antimicrobial action by electrostatically attracting these cationic peptides to the membrane. In contrast, the lack of negative

5. Patterson, T., Esteves, S., Dinsdale, R., Guwy, A. (2011). "Life cycle assessment of biogas infrastructure options on a regional scale", *Bioresource Technology* 102(15):7313-7323.

6. Kozbelt, A., Serafin, J. (2009). "Dynamic evaluation of high-and low-creativity drawings by artist and nonartist raters", *Creativity Research Journal* 21(4):349-360.

charges in the eukaryotic membrane of higher organisms combined with the high level of cholesterol (~50 mol %) (5, 6) may reduce the extent of binding and counter the effects of these peptides on the membrane.⁷

- However, cytogenetics and comparative morphology **do not confirm this hypothesis** (Zohary and Hopf, 2000). **Therefore**, plum **may result from** polyploid forms arising from cherry plums, forming a “*P. cerasifera*-*P. domestica* polyploid crop complex” (Zohary and Hopf, 2000). However, the possibility of secondary hybridisation with other species, including sloe, cannot be excluded.⁸

Presenting Justification

Presenting justification, the fifth and last possible strategy in the Identifying a Niche goal, usually occurs after the writer has discussed the gap, problem, question, or hypothesis. To accomplish this strategy, you can justify or motivate the need for your research. Alternately, you can demonstrate the value or worth of the research. Note how the published authors do this in the examples below:



Examples

- The study of the solar hard X-ray (HXR) flare spectra **may provide some useful information for** solar flares, such as the acceleration mechanisms of energetic electrons. The solar HXR flare spectra consist of thermal and nonthermal components (Aschwanden 2004; Dennis 1985).⁹
- **Empirical evidence** describing the temporal development of local plastic

7. Mani, R., Buffy, J., Waring, A., Lehrer, R., Hong, M. (2004). “Solid-state NMR investigation of the selective disruption of lipid membranes by protegrin-1”, *Biochemistry* 43(43):13839-13848.

8. Horvath, A., Balsemin, E., Barbot, J., Christmann, H., Manzano, G., Reynet, P., Laigret, F., Mariette, S. (2011). “Phenotypic variability and genetic structure in plum (< i> Prunus domestica L.), cherry plum (< i> P. cerasifera Ehrh.) and sloe (< i> P. spinosa L.)”, *Scientia Horticulturae* 129(2):283-293.

flow **is greatly desired. Therefore, novel experimental techniques are being developed** to characterize the grain and sub-grain scale deformation fields produced during deformation of polycrystalline materials. Digital image correlation (DIC) methods that utilize optical imaging are readily available for measuring macro-scale planar 2-D, and arbitrary 3-D, motion and deformation [3].¹⁰

The second goal of the Introduction presents the specific background information to provide your readers with an appreciation of how the paper advances the field in some way¹¹. Beware of repeating what you have read in other papers. A good research writer develops an ability “to say the same things that have been said many times before but in a different, interesting, intriguing way” (Wallwork, 2016, p. 195). When you **Identify a Niche**, you are giving the readers an orientation to how your work fits into the field.

Review

Now, let’s practice applying our knowledge of the second goal of the introduction section.



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<https://iastate.pressbooks.pub/isudp-2026-252/?p=167#h5p-12>

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9. Shao, C., Huang, G. (2009). “Comparative Study of Solar HXR Flare Spectra in Looptop and Footpoint Sources”, *The Astrophysical Journal* 691(1):299.
 10. Walley, J., Wheeler, R., Uchic, M., Mills, M. (2012). “In-situ mechanical testing for characterizing strain localization during deformation at elevated temperatures”, *Experimental Mechanics* 52 (4):405-416.
 11. Wallwork, A. (2016). *English for writing research papers*. Springer.

This excerpt is from the Journal of Applied Engineering in Agriculture¹².

12. Tumuluru, J., Sokhansanj, S., Lim, C., Bi, X., Lau, A., Melin, S., Oveisi, E., & Sowlati, T. (2010). Quality of wood pellets produced in British Columbia for export. *Applied Engineering in Agriculture*, 26(6).

INTRODUCTION GOAL 3: ADDRESSING THE NICHE

Addressing the Niche allows you to indicate how your work/research speaks to the niche that you have carved out for yourself. Usually, this goal occurs in the last part of the Introduction – the part just before the research questions. In this goal, you want to write directly about your purpose and values, and perhaps you’ll want to outline the structure or organization of your article. Basically, you define how your present study addresses the identified niche and how it contributes to the existing research. Also, you can explain – briefly – the outcomes of the project. Essentially, Goal 3 carves out a place for your research by pointing out how you are going to solve a problem or fill a gap. There are multiple ways you can effectively achieve the goal of addressing the niche into which your research fits:

Introduction

Establishing a knowledge territory

Identifying a niche

Addressing the niche

- Introducing research descriptively
- Announcing purpose of the study
- Presenting research questions
- Presenting research hypotheses
- Summarizing methods
- Clarifying definitions
- Announcing principal outcomes
- Stating value
- Outlining the structure

However, please don’t forget that these are not “rules.” We are presenting guidelines based on linguistic research investigating published academic journal articles. As a writer, you decide how to organize your writing so that you accomplish these goals. You don’t have to use all the strategies to accomplish any given goal!

Let’s get a closer look at each strategy to understand how they work.

Goal 3: Addressing the Niche

Introducing Your Research Descriptively

The **introducing your research descriptively** strategy concerns a notation of key characteristics of the research. Writers provide information that highlights what was accomplished or completed in the study.



Examples

- It transforms outcomes for each alternative into a common unit with a multi-attribute value (utility) function using weights that reflect the decision makers' preferences. **We report on** an MCDA involving the 26 most important stakeholders in two Swiss cases; a general and a psychiatric hospital. Details of the MCDA methodology are given in ref 24 and of the ecotoxicological risk assessment in ref 20.¹
- Using these data, in this article I examine the validity of the tests by analyzing what the teachers believed the tests measure and what they believed the tests' impacts are. **In essence, this paper investigates** the social consequences of a large-scale testing program and scrutinizes not only the intended outcome but also the unintended side effects of the English language tests (Messick, 1989, p. 16). Because the testing in Michigan was required by the federal government's No Child Left Behind (NCLB) Act, I begin by summarizing that law.²

To accomplish this, authors will often use highly contextualized words/phrases, such as *this*, *the present study*, *we*, *I*, *now*, and *here*, which you can see in **bold** in the examples above. However, you should be aware that this is not the announcement of the goals/aims of the study. This is a more general description of the research. If you would like to be more specific about your objectives, you can implement the strategy presented next.

1. Lienert, J., Koller, M., Konrad, J., McArdell, C., Schuwirth, N. (2011). "Multiple-criteria decision analysis reveals high stakeholder preference to remove pharmaceuticals from hospital wastewater", *Environmental Science & Technology* 45(9):3848-3857.

2. Winke, P. (2011). "Evaluating the Validity of a High-Stakes ESL Test: Why Teachers' Perceptions Matter", *TESOL Quarterly* 45(4):628-660.

Announcing the Purpose of the Study

Announcing the purpose of the study clearly articulates the intentions of the researcher(s) by specifying how the objectives address gaps in the research. It is common for writers to use words, such as *aim*, *purpose*, *goal*, *objective*, *target*, etc., to directly state their intentions. The examples below show how this is realized in published articles from high-impact journals:



Examples

- When this process of mutual adjustment goes well, people may remark that they are "in synch" or "on the same wavelength." **One goal of the present article is to show** that there is an important literal truth behind these colloquialisms. That is, as people converse and work together, major interpersonal issues—namely, agency and communion—come to have strongly entrained cyclical patterns, making partners' behaviors as interlocked or interdependent, as if they were dancing together.³
- Although Ca²⁺ signaling in B cells is widely assumed to be essential, the importance of SOC influx for physiological B cell functions was unclear. **To directly assess the involvement of SOC influx in B cells**, we generated mice with B cell-specific deletions of Stim1 and Stim2. We found that STIM1 and STIM2 critically regulated BCR-induced SOC influx and proliferation in vitro, and yet they were dispensable for B cell development and antibody responses in vivo.⁴

It's common to see phrases with *to* + a verb (e.g., *to show*, *to compare*, *to evaluate*, etc.) associated with this strategy. The [Academic Phrasebank](#) also provides some sentence starters:

- The specific objective of this study was to ...
- This study set out to investigate the usefulness of ...

3. Sadler, P., Ethier, N., Gunn, G., Duong, D., Woody, E. (2009). "Are we on the same wavelength? Interpersonal complementarity as shared cyclical patterns during interactions.", *Journal of Personality and Social Psychology* 97(6):1005.

4. Matsumoto, M., Fujii, Y., Baba, A., Hikida, M., Kurosaki, T., Baba, Y. (2011). "The calcium sensors STIM1 and STIM2 control B cell regulatory function through interleukin-10 production", *Immunity* 34(5):703-714.

- This research examines the emerging role of X in the context of ...
- This study systematically reviews the data for..., aiming to provide ...
- Drawing upon two strands of research into X, this study attempts to ...
- This study therefore set out to assess the effect of X ..., and the effect of ...
- The main aim of this study is to investigate the differences between X and Y.
- There are two primary aims of this study: 1. To investigate ... 2. To ascertain ...
- This study seeks to obtain data which will help to address these research gaps.
- One purpose of this study was to assess the extent to which these factors were ...
- The purpose of this investigation is to explore the relationship between X and Y.

Presenting Research Questions

Presenting research questions is a strategy for directly stating what queries were made about the data. Authors do this in an effort to specify the focus of the research and to highlight main topics or words that can help the reader navigate the remainder of the manuscript. Writers who choose to implement this step articulate their questions directly (with a question mark) or indirectly (a question in the form of a statement), both of which are exemplified below:



Examples

- From this perspective, strategic planning represents an inertial force that decreases the number of NPD projects. The purpose of our study is to provide empirical evidence on the debated role of strategic planning in generating NPD projects **by answering the two questions: (1) does strategic planning increase or decrease the number of NPD projects? and (2) if so, how can a firm manage controllable organizational factors to mitigate the adverse effect of strategic planning on the number of NPD projects for better performance?**⁵
- The increase in growth response due to irrigation was relatively small, with

5. Song, M., Im, S., Bij, H., Song, L. (2011). "Does Strategic Planning Enhance or Impede Innovation and Firm Performance?" *Journal of Product Innovation Management* 28(4):503-520.

no significant increase in basal area (Albaugh et al. 2004). **In this study, the questions we attempted to answer were whether the growth gains experienced from fertilization resulted in lower SG and percent latewood, as expected from previous studies; whether SG properties were affected by irrigation, implying the importance of water availability despite limited growth gains; and whether irrigation had an impact on the wood quality of fertilized trees different from that of unfertilized trees.**⁶

Direct questions always use a question-word order and end with a question mark (?). Some common ways to start a direct question include *wh*-words, such as *who*, *what*, *when*, *where*, *how*, and *why*, but research questions can commonly begin with other phrases such as: *to what degree*, *do/did*, *have/has*, etc. Indirect questions sometimes start with words such as *whether* or *if*.

Presenting Research Hypotheses

Presenting research hypotheses is a way for writers to share what they have found or hope to find that is directly relevant to the objectives or questions of the study. Authors utilize this step to introduce the assumptions to be tested, clarify expectations of the findings, and speculate about potential outcomes.

To present their research hypotheses, authors use verbs like *hypothesize*, *suggest*, *expect*, *predict*, etc., the subjunctive mood like *would expect*, *could be possible*, and modal verbs such as *could*, *might*, and *may*. Consider the following examples:



Examples

- We focused on school support because of the significant role of

6. Love-Myers, K., Clark, A., Schimleck, L., Dougherty, P., Daniels, R.. (2010). "The effects of irrigation and fertilization on specific gravity of loblolly pine", *Forest Science* 56(5):484-493.

environment in influencing human behaviors (Lewin, 1936). **We believe that** school support, a contextual factor, is intricately related to teacher motivation, a personal factor.⁷

- As previous research has demonstrated that the learners' view towards a learning environment strongly influences their learning outcomes and learning process, it can be discussed whether program-defined adaptivity is not only effective because of the underlying learner models, but also because the adaptivity is perceived and experienced as such by the learners. In this study, we apply the cognitive mediational paradigm and **hypothesize that** perceptions of adaptivity mediate the relation between adaptive instruction and learners' motivations and learning outcomes.⁸

You can use the verb *hypothesize* or the noun *hypothesis*, but be careful replacing the word with synonyms, which could carry different connotations because of their nuanced meanings.

Summarizing Methods

The strategy **summarizing methods** allows writers to present their procedures for the first time. However, you should note that the declaration is a *summary* of the methods and shouldn't be too detailed. Here are some examples from published writing:



Examples

- Recently, Yu et al. (2008a, b) employed a novel EPS fractionation approach to obtain the pellets (cells) by extracting the EPS matrix. **In this study,**

7. FiLam, S., Cheng, R. W., Choy, H. C. (2010). "School support and teacher motivation to implement project-based learning", *Learning and Instruction*, 20, pp. 487-497.

8. Vandewaetere, M., Vandercruysse, S., Clarebout, G., "Learners' perceptions and illusions of adaptivity in computer-based learning environments", *Education Tech Research Dev*, pp. NA.

aerobic granules seeded with activated sludge flocs and pellets, respectively, **were cultivated in** two sequencing batch reactors (SBRs), then these two kinds of granules were both stored at 25 +/- 1 degrees Celsius for 3 weeks. The main purposes of this study were to investigate their responses to storage and explore the mechanism of stability loss.⁹

- We propose that HRO status can be achieved through a systematic process linked to top leadership. **We empirically test this proposition by building** a model for improving patient safety in hospitals.¹⁰

Note that this strategy can be implemented by using either passive or active voice. Both are appropriate, but the decision of whether to use one or the other is usually based on the discipline in which you conduct research. The [Academic Phrasebank](#) provides other examples, and from the list below, you can see that there are a variety of forms that you can use to effectively realize this strategy:

- Data for this study were collected using ...
- Five works will be examined, all of which ...
- This investigation takes the form of a case-study of the ...
- This study was exploratory and interpretative in nature.
- This study uses a qualitative case study approach to investigate ...
- The research data in this thesis is drawn from four main sources: ...
- The approach to empirical research adopted for this study was one of ...
- This dissertation follows a case-study design, with in-depth analysis of ...
- By employing qualitative modes of enquiry, I attempt to illuminate the ...
- Qualitative and quantitative research designs were adopted to provide ...
- Both qualitative and quantitative methods were used in this investigation.
- A holistic approach is utilised, integrating X, Y and Z material to establish ...
- The study was conducted in the form of a survey, with data being gathered via ...
- The methodological approach taken in this study is a mixed methodology based on ...
- A combination of quantitative and qualitative approaches was used in the data analysis.

9. Xu, H., He, P., Wang, G., Yu, G., Shao, L. (2010). "Enhanced storage stability of aerobic granules seeded with pellets", *Bioresource Technology* 101(21):8031-8037.

10. McFadden, K., Henagan, S., Gowen III, C. (2009). "The patient safety chain: Transformational leadership's effect on patient safety culture, initiatives, and outcomes", *Journal of Operations Management* 27(5):390-404.

Clarifying Definitions

Clarifying definitions is the strategy writers use when they need to inform the reader of terms or concepts as they are used in the research. By implementing this step, authors can explain the meaning of terminology, provide working definitions, and/or clarify concepts. Sometimes scholars use this strategy to demonstrate how the terms or concepts used in the paper are similar to or different from the way the terms are typically used in the field, which helps readers to avoid misinterpreting the wording.

The definitions and/or terms used in the study may come from previous research, or they may be new terminology or phrasing that the author has coined. Look at the examples below to take note of how published writers clarify definitions in their manuscripts:



Examples

- Some organizations require great attention to preventing mistakes because errors could have serious implications to public safety. **High reliability organizations (HROs) refer** to organizations or systems that operate in complex and hazardous conditions and yet consistently achieve nearly error-free performance. **They are termed HROs because** they seem to function in a more reliable fashion than other similar organizations.¹¹
- **Cardiovascular disease (CVD) is defined as** a group of vascular disorders that involve the heart as well as the vasculature. CVD remains the leading cause of death in developed nations and accounts for over one-third of all deaths within the United States each year [1].¹²

If you'd like to explore more ways to clarify definitions, the [Academic Phrasebank](#) not only provides a list of general ideas, but also includes more specific ways to define words for a variety of different communicative goals (e.g., indicating difficulties to define a term, referring to others' definitions etc.). Here are a few starter

11. McFadden, K., Henagan, S., Gowen III, C. (2009). "The patient safety chain: Transformational leadership's effect on patient safety culture, initiatives, and outcomes", *Journal of Operations Management* 27(5):390-404.

12. Wood, J., Shah, N., McKee, C., Hughbanks, M., Liliensiek, S., Russell, P., Murphy, C. (2011). "The role of substratum compliance of hydrogels on vascular endothelial cell behavior", *Biomaterials* 32(22):5056-5064.

sentences that might help you to envision how writers accomplish the strategy of defining terms, which contributes to addressing the niche:

- Throughout this paper, the term ‘X’ will refer to ...
- The term ‘X’ will be used in this thesis to refer to ...
- Historically, the term ‘X’ has been used to describe ...
- It is necessary here to clarify exactly what is meant by ...
- The phrase ‘X’ will be used in this study to describe the ...
- According to Smith (2002), X can be defined as follows: ‘ ... ’
- In this article, the abbreviation XYZ will be used to refer to ...
- Throughout this dissertation, the term ‘X’ will be used to refer to ...
- The term ‘X’ is a relatively new name for ..., commonly referred to as ...
- In this essay, the term ‘X’ will be used in its broadest sense to refer to all ...
- In this dissertation, the terms ‘X’ and ‘Y’ are used interchangeably to mean ...
- While a variety of definitions of the term X have been suggested, this paper will use the definition first suggested by Smith (1968) who saw it as ...

Announcing Principal Outcomes

Announcing principal outcomes briefly states the most important results of the study. In other words, you can think of this strategy as a preview of your full Results section. Using this strategy shows which specific findings contribute to the goal of Addressing the Niche while also providing a preview of the more detailed outcomes, which will be elaborated on later in your paper. Below are some examples of the announcing principal outcomes strategy:



Examples

- Instead, the template-bridging effect of the membrane binding to the Gla domains of both fXa and PZ, together with the specific interaction of the two Gla domains shown previously by Rezaie and co-workers (6), were the most important factors in bringing about the PZ-dependent acceleration of fXa inhibition in the presence of phospholipid and Ca²⁺. **Importantly, we found that** a ZPI variant with P1 arginine reacted at a diffusion-limited rate

with fXa. Reaction was predominantly as a substrate, as a result of rapid acylation and deacylation, and did not depend on PZ or other cofactors.¹³

- The goal of this study was to identify and test the importance of potential drivers of agricultural land abandonment and consequent natural vegetation re-growth, using a spatially explicit statistical model, based on an economic theoretical framework. **There are three main findings of this study.** Firstly, the research area in the municipality of Ancud, Chiloe Island, in Southern Chile has been proposed by Food and Agriculture Organization of The United Nations (FAO) as a Globally Important Agricultural Heritage System (GIAHS), which sustains itself on the permanence of traditional farming practices that are threatened by land abandonment.¹⁴

To announce the principal outcomes of their research, authors typically use verbs such as *find*, *show*, *indicate*, *reveal*, *explain*, *demonstrate*, *determine*, *prove*, *establish*, etc. Regardless of the verb you use, however, you want to be sure that you are previewing just the most important findings. You'll have an entire section of the paper (the Results section) to provide the details.

Stating Value

Stating the value of present research explains the significance of your research. It functions as a kind of argument that the study provides an important contribution to the field. Here are two examples:



Examples

- Therefore, this work's intent was to study the bioaccumulation of the

13. Huang, X., Dementiev, A., Olson, S., Gettins, P. (2010). "Basis for the specificity and activation of the serpin protein Z-dependent proteinase inhibitor (ZPI) as an inhibitor of membrane-associated factor Xa", *Journal of Biological Chemistry* 285(26): 20399-20409.

14. Díaz, G. I., Nahuelhuala, L., Echeverriá, C., Marín, S. (2011). "Drivers of land abandonment in Southern Chile and implications for landscape planning", *Landscape and Urban Planning*, 99, pp. 207–217.

contaminants mentioned previously in the autochthonous black pig feeding substantially on natural pastures and reared under different extensive farming systems within the preserved area of the Regional Nebrodi Park of Sicily (Italy). **The acquired information could provide answers to food safety issues for locally processed meat production and, at the same time, endorse the abovementioned sustainable farming practices, i.e., that outdoor and wild pigs be recognized as sensitive sentinels to monitor the overall quality of the environment (36).**¹⁵

- **The research we report here offers a possible explanation for why situational cues, such as numerical representation, might contribute to such performance outcomes.** We propose that, by triggering objective experiences of identity threat (e.g., cognitive and physiological vigilance) and subjective experiences of identity threat (e.g., a decreased sense of belonging and decreased desire to participate in the setting), subtle situational cues may have powerful and far-reaching effects for potential targets of stereotypes and stigma.¹⁶

Many writers implement this strategy through the use of verbs such as *can*, *could*, *might*, or *may* in combination with verbs like *offer*, *provide*, *generate*, or *contribute*. Other authors use adjectives or adverbs such as *possible*, *potential*, *likely*, or *probably*. The [Academic Phrasebank](#) provides the following sentence starters as suggestions:

- This is the first study to ...
- This study provides new insights into ...
- This work will generate fresh insight into ...
- The study offers some important insights into ...
- Understanding the link between X and Y will help ...
- This is the first study to undertake a longitudinal analysis of ...
- The present research explores, for the first time, the effects of ...

15. Brambilla, G., De Filippis, S., Iamiceli, A., Iacovella, N., Abate, V., Aronica, V., Di Marco, V., Di Domenico, A. (2010). "Bioaccumulation of dioxin-like substances and selected brominated flame retardant congeners in the fat and livers of black pigs farmed within the Nebrodi Regional Park of Sicily", *Journal of Food Protection*® 74(2): 261-269.

16. Murphy, M., Steele, C., Gross, J. (2007). "Signaling threat how situational cues affect women in math, science, and engineering settings", *Psychological Science* 18(10):879-885.

- The importance and originality of this study are that it explores ...
- The findings should make an important contribution to the field of
- Characterisation of X is important for our increased understanding of ...
- It is hoped that this research will contribute to a deeper understanding of ...
- This study aims to contribute to this growing area of research by exploring ...
- This project provided an important opportunity to advance the understanding of ...
- Therefore, this study makes a major contribution to research on X by demonstrating ...
- There are several important areas where this study makes an original contribution to ...
- The experimental work presented here provides one of the first investigations into how ...

Outlining the Structure

Outlining the structure of the paper is the final possible strategy that you can use to accomplish the third goal of the Introduction. This strategy is a preview of the organization of the manuscript. The use of an outline gives the reader insight into how the paper is structured, thus giving an overview of each section and its content. You could consider this strategy like written directions, which provide a guide to the paper and encourage the easy location of specific content. Consider the following examples, in which authors outline the structure of their papers:



Examples

- My results can therefore help to explain why models that treat product locations as fixed often do poorly at predicting how prices change after mergers (Peters, 2006; Whinston, 2006; Ashenfelter and Hosken, 2008) and why competitors may choose to lobby an antitrust authority to prohibit a merger even when synergies are unlikely. **The article is structured as follows. The rest of the Introduction reviews the related literature. Section 2 describes the data and how I use playlists to measure differentiation. Section 3 presents the main results.**¹⁷

17. Sweeting, A. (2010). "The effects of mergers on product positioning: evidence from the music radio industry", *The RAND Journal of Economics* 41(2): 372-397.

- **This article is structured as follows. The second section describes the study sites, the simulated cork oak silviculture models, the data collection, the private amenity valuation, and the afforestation net benefit estimation. The third section presents the main results. The fourth section closes with discussion and conclusions.**¹⁸

Usually, writers who utilize this strategy begin with an overview sentence followed by a list of section-by-section content. The examples above use similar tactics to each other even though they are from very different disciplines. Additionally, the [Academic Phrasebank](#) has a further list of ideas, as noted below:

- The first section of this paper will examine...
- This paper begins by ... It will then go on to ...
- My thesis is composed of four themed chapters.
- The essay has been organised in the following way.
- The remaining part of the paper proceeds as follows: ...
- The main issues addressed in this paper are: a), b) and c).
- This paper first gives a brief overview of the recent history of X.
- This paper has been divided into four parts. The first part deals with ...
- The third chapter is concerned with the methodology used for this study.
- The overall structure of the study takes the form of six chapters, including ...
- Chapter Four analyses the results of interviews and focus group discussions undertaken during ...
- Chapter Two begins by laying out the theoretical dimensions of the research, and looks at how ...
- The fourth section presents the findings of the research, focusing on the three key themes that ...

Review

Now, let's practice applying our knowledge of the third goal of the introduction section.

18. Ovando, P., Campos, P., Oviedo, J., Montero, G. (2010). "Private Net Benefits from Afforesting Marginal Cropland and Shrubland with Cork Oaks in Spain", *Forest Science* 56(6): 567-577.



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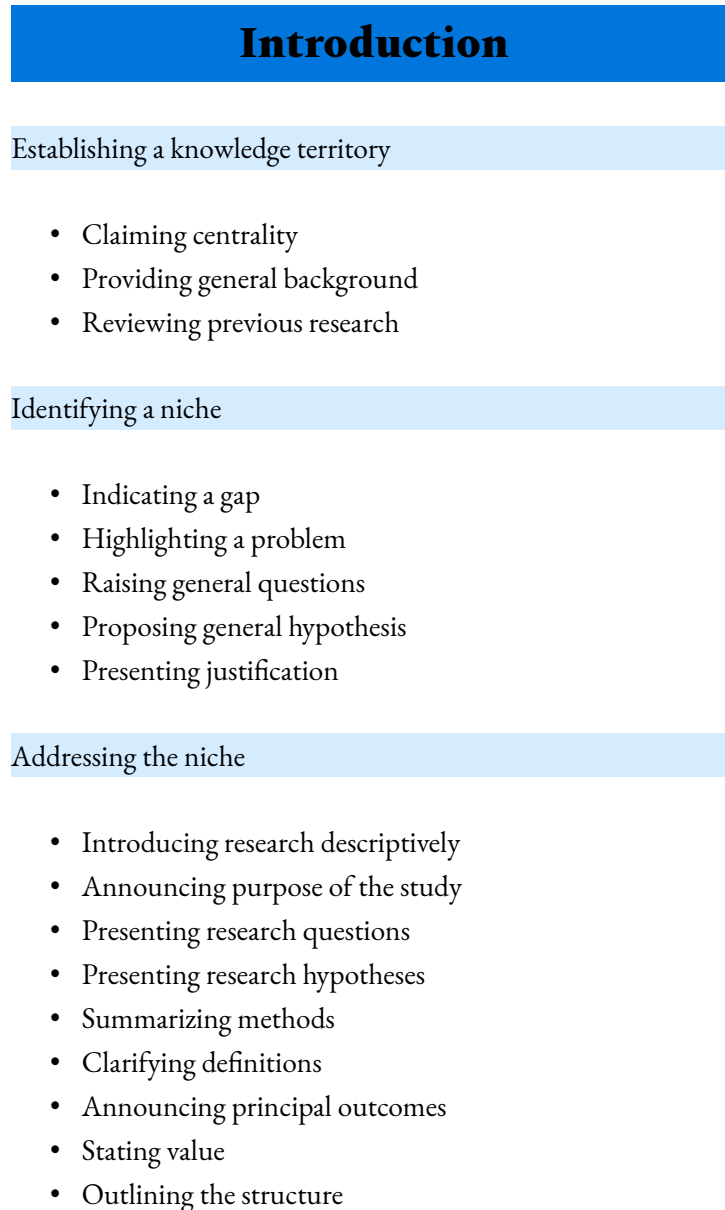
Excerpt A is from the Journal of Experimental Psychology¹⁹ and Excerpt B is from the Journal of Personality and Social Psychology²⁰.

19. Hirst, W., Phelps, E. A., Buckner, R. L., Budson, A. E., Cuc, A., Gabrieli, J. D., & Vaidya, C. J. (2009). Long-term memory for the terrorist attack of September 11: Flashbulb memories, event memories, and the factors that influence their retention. *Journal of Experimental Psychology: General*, 138(2), 161.

20. Excerpt A is from the Journal of Experimental Psychology[19] and Excerpt B is from the Journal of Personality and Social Psychology[20].

SUMMARY

We have now reviewed the three goals and a variety of strategies that you can use to help write the Introduction section of a research article. The image below provides a snapshot of this chapter:





Key Takeaways

There are 3 goals for Introduction sections:

1. **Establishing a Knowledge Territory:** Demonstrate what you know and what has already been established in the field while holding the attention of the reader so that they are interested enough to keep reading.
2. **Identifying a Niche:** Point out exactly what is the problem or gap in the literature, which sets the reader up for the third and final communicative goal of an Introduction.
3. **Addressing the Niche:** Justify the research without being formulaic; as a writer, you have the freedom to present your research in whatever way you feel best accomplishes these communicative goals.

Remember to explore published research article within your field! Rhetorical choices are often discipline- and journal-dependent, making it important to notice the similarities and differences in the way they are achieved. Here are a few important points:

- There is no linear order for organizing your content to fulfill these communicative goals.
- Some strategies are used more extensively than others.
- Different strategies can be combined to achieve a stronger communicative effect.
- The use of strategies varies depending on disciplinary conventions.
- It is up to us as academic writers to evaluate our writing intentions and assess the degree to which we accomplish our goals.

Let's try one final exercise to practice applying your knowledge of Introductions.

Review

Now, let's look at the excerpts¹ below so we can practice identifying the three communicative goals of the introduction section and their subsequent strategies.



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Additional Resources

The literature review section of the research article is commonly included in the Introduction section and regularly follows the outlined goals and strategies prominent in published Introductions. The literature review is a complicated component of the research article and requires a comprehensive synthesis of relevant research. This critique can serve as a means for authors to expose the need for the current research project based on insufficient, contradicting, or problematic findings from the past. Read more about techniques for writing a literature review from these two web resources:

- [How to Write a Literature Review \(WikiHow\)](#)
- [Williams College Literature Review Tutorial](#)

1. Lee, S. (2011). Evaluating serviceability of healthcare service scapes: Service design perspective. *International Journal of Design*, 5(2), 61-71.

DRAFTING YOUR INTRODUCTION

Draft Your Introduction



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We'll now move on to the next section of empirical research articles: The Methods.

CHAPTER 3: WRITING THE METHODS



Learning Objectives

After completing this chapter, you should be able to:

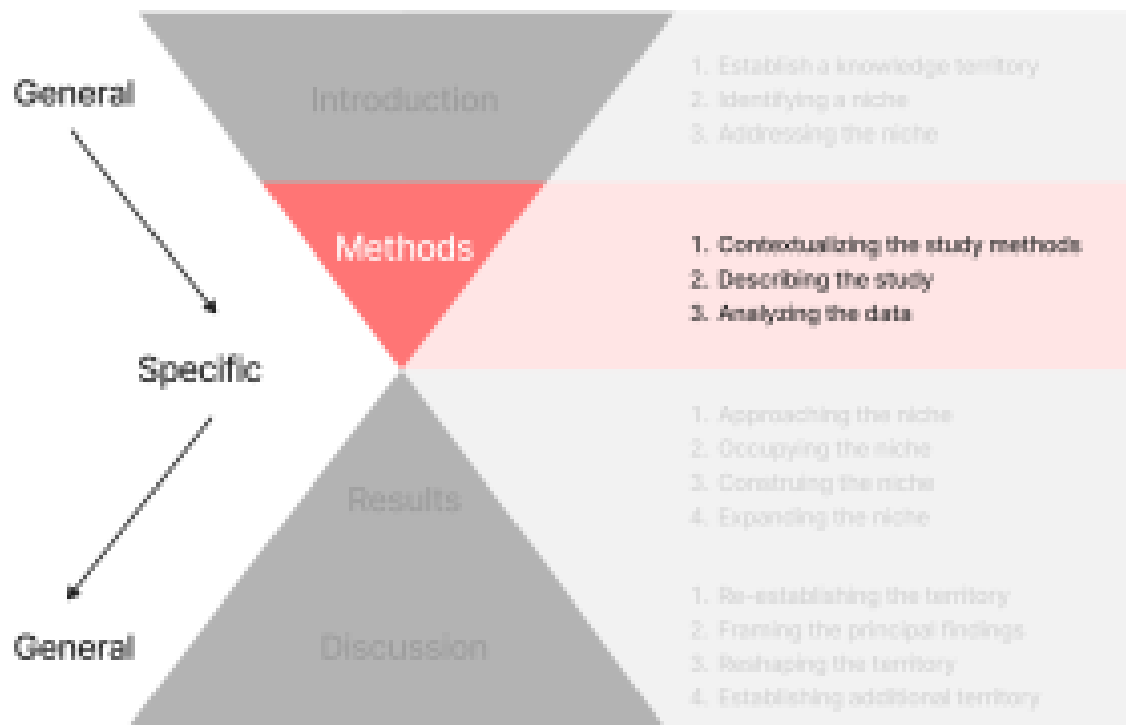
- Articulate the importance of the Methods section.
- Recognize the communicative goals that researchers compose their Methods to achieve.
- Apply strategies to achieve each of the three communicative goals.
- Optimize the language for writing your Methods.
- Evaluate your Methods section.

GOALS OF THE METHODS SECTION

The second section of a standard empirical research article is the **Methods**. Unlike the Introduction, the Methods does not move from a broad to a narrow scope. It is specific throughout the section, and you can see this specificity in the type of content that writers include. It is important to note that regardless of the methodology research writers employ (e.g., qualitative, experimental, or mixed methods), all writers compose their section to achieve the same three communicative goals:

1. **Contextualizing the study's methods**
2. **Describing the study**
3. **Analyzing the data**

These goals attempt to explain to the reader — in a very detailed fashion — how their study was carried out.



Details are of utmost importance in this section, and one way to think about how detailed the content should be is to imagine that someone is reading your Methods section with the purpose of replicating your research. Would they be able to conduct this same study based on what you have written in this section? You want the

answer to be YES. By contextualizing, describing, and analyzing, you can explain to the reader exactly what, when, where, and how you did what you did as you conducted your research.

In this chapter, we will closely examine each of these three communicative goals and discuss some examples from published research methods.



Warm-Up

- What types of information does the reader expect to see in the Methods section?
- Which pieces of information could contribute to achieving each communicative goal of the Methods?

METHODS GOAL 1: CONTEXTUALIZING THE STUDY'S METHODS

The first goal of writing your Methods section is to contextualize (provide context or a “picture” of) the procedures you followed to conduct the research. Doing this requires attention to detail. To contextualize methods means that you explain all of the conditions in which the study occurred. It might be helpful for you to think of answering the questions *who*, *what*, *when*, *where*, *how*, and *why*. To accomplish Goal 1, **Contextualizing the Study Methods**, you completely describe the circumstances surrounding the research. Here are several **strategies** you can use to help you successfully achieve this goal in a detailed manner:

Methods

Contextualizing the study methods

- Referencing previous works
- Providing general information
- Identifying the methodological approach
- Describing the setting
- Introducing the subjects/participants
- Rationalizing pre-experiment decisions

Describing the study

Analyzing the data

We’ll now discuss each of these strategies and provide some examples of the strategy in use in published research.

Goal 1: Contextualizing the Study Methods

Referencing Previous Works

Referencing previous works is a strategy used to relate your research to the literature. The strategy involves

a direct reference to another author or an explicit mention of a study. Here are two examples taken from published research articles in highly varied fields. Note the language that has been bolded to illustrate how this strategy can be enacted:



Examples

- The entire experiment consisted of six situations, and each situation was tested employing one advertisement. **The balanced Latin-square method proposed by Edwards (1951) was used to arrange the six experimental situations.** To simplify the respondents' choices with regard to order and sequence, all of the print advertisements tested were appropriately arranged in the experimental design.¹
- The Eulerian-granular model in ANSYS 12.0 was used to model the interactions between three phases: one gaseous phase and two granular particle phases within a fluidized bed **taken from the literature [32]**. This model was chosen over the Eulerian-Lagrangian models as it is computationally more efficient with regards to time and memory.²

Referencing previous works can occur almost anywhere in the Methods section because it can be used to validate or justify decisions about any of the data collected, procedures used, and analyses carried out. Some common phrases associated with this strategy include the following, as noted in the [Academic Phrasebank website](#):

- Many researchers have utilised X to measure ...
- One of the most well-known tools for assessing ...
- Traditionally, X has been assessed by measuring ...
- A number of techniques have been developed to ...
- Different methods have been proposed to classify ...
- X is the main non-invasive method used to determine ...

1. Lin, P. C., & Yang, C. M. (2010). Impact of product pictures and brand names on memory of Chinese metaphorical advertisements. *International Journal of Design*, 4(1).

2. Armstrong, L. M., Gu, S., & Luo, K. H. (2011). Effects of limestone calcination on the gasification processes in a BFB coal gasifier. *Chemical Engineering Journal*, 168(2), 848-860.

- Different authors have measured X in a variety of ways.
 - Several methods currently exist for the measurement of X.
 - Previous studies have based their criteria for selection on ...
 - X is one of the most common procedures for determining ...
 - There are three main types of study design used to identify ...
 - The use of life story data has a relatively long tradition within X.
 - Recent advances in X methods have facilitated investigation of ...
 - There are a number of instruments available for measuring the ...
 - X and Y are currently the most popular methods for investigating ...
 - Recently, simpler and more rapid tests of X have been developed.
 - In most recent studies, X has been measured in four different ways.
 - The use of qualitative case studies is a well-established approach in ...
 - Xs have been used in the past to investigate the mechanical properties of ...
-

Providing General Information

Providing general information allows a writer to provide background that is specific to the methods. This can be theoretical, empirical, informational, or experiential background to the methodology of the study. You can use this strategy to build a bridge for the reader. The bridge should connect your study to other studies that have utilized the same or similar methodology. Here are two examples taken from published research articles:



Examples

- The animals used during this study were slaughtered in accredited slaughterhouses according to the rules on animal protection defined by French law³. **The Qualvigene program, described in detail elsewhere (Allais et al., 2010), was a collaborative research program involving AI companies, INRA (the French National Institute for Agricultural Research) and the Institut de l'Élevage (Breeding Institute) in France.**

3. Code Rural, articles R214-64 to R214-71, <http://www.legifrance.gouv.fr>

The program was initiated to study the genetic determinism of beef and meat quality traits (Malafosse et al., 2007).⁴

- **This study focused on stemwood when examining alternative woody biomass management regimes for loblolly pine.** PTAEDA3.1, developed with data from a wide range of loblolly pine plantations in the southern United States, was used to simulate growth as well as competition and mortality effects and predict yields of various management scenarios (Bullock and Burkhart 2003, Burkhart et al. 2004).⁵

Providing general information is a strategy that helps to provide context for an author's explanation of methodological steps. By including more information, you are adding to the specificity and level of detail, which is one of the most important aspects of the Methods section.

Identifying the Methodological Approach

Identifying the methodological approach allows a writer to pinpoint the exact method that was adopted to accomplish the study's research objectives. This is a strategy you could use if there was a specific set of procedures for your approach or, in some cases, even a predetermined framework for how to carry out the study. The main purpose of this step is to introduce the methodological approach or experimental design used for the current study to inform the reader of the selected approach, announce credible research practices known in the field, and possibly transition to describing the experimental procedures. Consider the following examples:

4. Allais, S., Journaux, L., Levéziel, H., Payet-Duprat, N., Raynaud, P., Hocquette, J. F., ... & Renand, G. (2011). Effects of polymorphisms in the calpastatin and μ -calpain genes on meat tenderness in 3 French beef breeds. *Journal of Animal Science*, 89(1), 1-11.

5. Guo, Z., Grebner, D., Sun, C., & Grado, S. (2010). Evaluation of Loblolly pine management regimes in Mississippi for biomass supplies: a simulation approach. *Southern Journal of Applied Forestry*, 34(2), 65-71.



Examples

- **In both seasons, the experiments were arranged in a complete randomized block design with four replications, using a plot size of 3.45m x 15m each containing 114 plants.** Three levels of organic supplementation [0 kgm⁻² (S0), 0.35 kgm⁻² (S0.35) and 0.70 kgm⁻² (S0.70)] were incorporated into the soil 2 days before solarization.⁶
- **To address these hypotheses rigorously, we conducted a randomized controlled trial with children clustered within schools.** All three interventions were delivered by the same teaching assistant in each school.⁷

The Academic Phrasebank website provides a list of [sentence starters](#) that would indicate the use of this strategy. Here are a few examples:

- The solution was then assayed for X using the Y method.
- X was prepared according to the procedure used by Jones *et al.* (1957).
- The synthesis of X was done according to the procedure of Smith (1973).
- X was synthesised using the same method that was detailed for Y, using ...
- Samples were analysed for X as previously reported by Smith et al. (2012).
- Analysis was based on the conceptual framework proposed by Smith et al. (2002).
- This compound was prepared by adapting the procedure used by Jones *et al.* (1990)...

Identifying the methodological approach is a strategy that supplies a frame for a description of experimental steps and methodological decisions. By describing the new methods you developed or explaining how you employed an established methodology, you are bolstering your credibility as a researcher in connecting your study-related choices to past researchers' procedures.

6. Mauromicale, G., Longo, A. M. G., & Monaco, A. L. (2011). The effect of organic supplementation of solarized soil on the quality of tomato fruit. *Scientia Horticulturae*, 129(2), 189-196.

7. Clarke, P. J., Snowling, M. J., Truelove, E., & Hulme, C. (2010). Ameliorating children's reading-comprehension difficulties: A randomized controlled trial. *Psychological Science*, 21(8), 1106-1116.

Describing the Setting

Describing the setting of the study involves conveying to the reader details about where or under what conditions the study happened. The *setting* is all about the *place*, *conditions*, and *surroundings*. In other words, this strategy details the characteristics of the environment in which the research was conducted, which often answers the “where” and “when” questions. Information may include details about the place and temperature; it may also include some temporal (or time-related) descriptors such as the time of the year.

It should be noted that this strategy may overlap with some strategies in Goal 2 (which describes the tools used or the experimental procedures conducted), but it remains distinct from them in that describing the setting specifically references the inherent characteristics of the context or environment in which the study took place, and not the characteristics of the materials used to accomplish the experiment or to affect some change in the subject that is being examined. You’ll read more about Goal 2 in the next chapter. Here are two examples showing how published authors describe the setting of their research:



Examples

- The mares were admitted at day 310 of pregnancy, **housed in wide straw bedding boxes** and fed with hay and concentrates twice a day.⁸
- All three studies were performed **in the eastern half of the SRS in the RCW management area** (*US Department of Energy 2005*).⁹

Describing the setting helps the reader to picture the situation and the conditions in which the experiment was completed.

Introducing the Subjects/Participants

Introducing the subjects or participants in your study helps you to describe the characteristics of your

8. Castagnetti, C., Mariella, J., Serrazanetti, G. P., Grandis, A., Merlo, B., Fabbri, M., & Mari, G. (2007). Evaluation of lung maturity by amniotic fluid analysis in equine neonate. *Theriogenology*, 67(9), 1455-1462.

9. Goodrick, S. L., Shea, D., & Blake, J. (2010). Estimating fuel consumption for the upper coastal plain of South Carolina. *Southern Journal of Applied Forestry*, 34(1), 5-12.

sample. Whether you have human, animal, or inanimate participants or subjects, you will still need to provide the reader with a careful description of them. For a study involving humans, this strategy answers the “who” question. For studies without humans, this strategy often answers the “what” question. It should be noted, however, that not all disciplines have subjects/participants; when subjects/participants can be identified, this strategy allows you to describe subjects/participants and their original/pre-experimental characteristics, properties, origin, number, composition/construction, etc. Introducing the subjects or participants also details the process by which subjects/participants were recruited/selected.

Below are a few examples excerpted from published reports of research with the relevant language in **bold** to illustrate how the words/phrases work to enact the strategy:



Examples

- **Participants in this study included 10 TAs** enrolled in this French doctoral program.¹⁰
- **The Mexican populations, Chetumal and Tulum (Mex-1 and Mex-2, respectively),** have large resin-producing glands, while **the Venezuelan populations, Tovar and Caracas (Ven-1 and Ven-2, respectively),** have smaller glands.¹¹

The Academic Phrasebank website provides a list of [sentence starters](#) that would indicate the use of this strategy. Here are a few examples:

- The subjects were selected on the basis of the degree of homogeneity of their ...
- A comparison group of 12 male subjects without any history of X was drawn from a pool of ...
- A random sample of patients with ... was recruited from ...
- Articles were searched from January 1965 until April 2014.
- The sample was representative with respect to gender and ...
- Forty-seven students studying X were recruited for this study.

10. Mills, N. (2011). Teaching assistants' self-efficacy in teaching literature: Sources, personal assessments, and consequences. *The Modern Language Journal*, 95(1), 61-80.

11. Pélabon, C., Carlson, M. L., Hansen, T. F., Yoccoz, N. G., & Armbruster, W. S. (2004). Consequences of inter-population crosses on developmental stability and canalization of floral traits in *Dalechampia scandens* (Euphorbiaceae). *Journal of Evolutionary Biology*, 17(1), 19-32.

- A systematic literature review was conducted of studies that ...
- Just over half the sample (53%) was female, of whom 69% were ...
- Of the initial cohort of 123 students, 66 were female and 57 male.
- Eligible women who matched the selection criteria were identified by ...
- Only children aged between 10 and 15 years were included in the study.
- The participants were divided into two groups based on their performance on ...
- Two groups of subjects were interviewed, namely X and Y. The first group was...
- The project used a convenience sample of 32 first-year modern languages students.
- All of the participants were aged between 18 and 19 at the beginning of the study...
- All studies described as using some sort of X procedure were included in the analysis.
- Participants were recruited from 15 clinics across ..., covering urban and rural areas ...
- The initial sample consisted of 200 students, 75 of whom belonged to minority groups.

Introducing your subjects/participants is key because of the important role that a sample plays in the design of the study. Think of this strategy as a way to make an argument for the value of your sample.

Rationalizing Pre-Experiment Conditions

Rationalizing pre-experiment conditions is a way to show the reader how you attained your specific sample or how you decided about the methods you chose prior to actually carrying out the experimental procedures. Two examples from published research articles are supplied below:



Examples

- **The literature review presented above leads us to formulate our research questions more precisely.** First, we ask whether there is a difference in well-being between the unemployed and those currently employed.¹²
- We defined two sub-samples of LAEs split at $R = 25.5$. **The continuum-bright (UV-bright hereafter) sub-sample of 118 LAEs enables a direct**

12. Ervasti, H., & Venetoklis, T. (2010). Unemployment and subjective well-being: An empirical test of deprivation theory, incentive paradigm and financial strain approach. *Acta Sociologica*, 53(2), 119-139.

comparison with the SED parameters of R less than 25.5 “BX,” star-forming galaxies in the same range of redshift (Steidel et al. 2004). The remaining 98 LAEs are classified as UV-faint.¹³

This strategy can help you provide rationale for any of the strategies associated with Goal 1 of the Methods, which may involve why a particular sample or setting was included/excluded in the study. On the [Academic Phrasebank website](#), sentence starters are provided for indicating the inclusion or exclusion criteria you may have used in your study.

- Criteria for selecting the subjects were as follows:
- Publications were only included in the analysis if...
- To identify X, the following parameters were used: ...
- The area of study was selected for its relatively small ...
- Five individuals were excluded from the study on the basis of ...
- This location was chosen because of the expected difficulty in obtaining ...

Language Suggestions for Goal 1 Strategies

Keep in mind that the Methods section is very important. Even if readers are skimming a published article, they typically read the methods with careful attention to the details provided. Because Methods sections are often rote narratives of procedures, there are several frequently adopted words or phrases that are standard. The [Academic Phrasebank website](#) provides a list of these, which are summarized in the table below:

13. Guaita, L., Acquaviva, V., Padilla, N., Gawiser, E., Bond, N. A., Ciardullo, R., ... & Schawinski, K. (2011). Ly α -emitting galaxies at $z=2.1$: Stellar masses, dust, and star formation histories from spectral energy distribution fitting. *The Astrophysical Journal*, 733(2), 114.

Type of Language	Example
Infinitive of purpose (<i>to</i> + base form verb)	To measure X, we ... To establish X, the participants were ...
Expressing purpose with “for”	For the questions in the interview, we adapted ... For the purpose of analysis, X was ...
Sequence words (related to timing)	Prior to After
Passive voice verbs (<i>be</i> + past participle)	All participants were sent ... The data were normalized using ...
Adverbs of manner	A sample was then carefully injected into ... The mixture was then gradually heated ...
“Using” + instruments	Data were collected using Xs... The subjects were recruited using email...

There are several example language phrases you may use to incorporate as you write the Methods section. Using the goals and strategies as a guide, you can choose the words and phrases suggested to ensure that your methods are appropriately detailed and clear.

Review

Now, let's practice applying our knowledge of the first goal of the Methods section.



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Excerpt A is from the Journal of Marketing Research¹⁴ and Excerpt B is from the Journal of American Educational Research¹⁵.

14. Boyd, D.E., Chandy, R.K. & Cunha Jr, M. (2010). When do chief marketing officers affect firm value? A customer power explanation. *Journal of Marketing Research*, 47(6), 1162-1176.

15. Fantuzzo, J. W., Gadsden, V. L., & McDermott, P. A. (2011). An Integrated Curriculum to Improve Mathematics, Language, and Literacy for Head Start Children. *American Educational Research Journal*, 48(3), 763–793.

METHODS GOAL 2: DESCRIBING THE STUDY

The second goal of writing your Methods section is to **Describe the Study**. This represents the primary portion of the Methods section and is the place for you to include details of what you actually did to conduct the research. To accomplish this goal, you will need to explain how, when, and where you obtained the data, and any data descriptors. If your study involves the use of variables, then part of the objective for this goal is to highlight their purpose. Usually, authors explain why they did or did not include certain variables along with detailing their experimental procedures and noting tools, instruments, materials, or equipment that may have been used. Finally, another purpose of this goal is to provide a rationale for the decisions that were made along the way of collecting, analyzing, and interpreting the data.

Goal 2 paints a picture of the data and the tools/resources/materials used in the study. Most of your Methods section will be used to accomplish this goal. As such, Goal 2, Describing the Study, includes outlining all the processes you (the researcher) used from start to finish. Here are several **strategies** you can implement that will allow you to accomplish this goal:

Methods

Contextualizing the study methods

Describing the study

- Acquiring the data
- Describing the data
- Identifying variables
- Describing experimental/study procedures
- Tools/instruments/materials/equipment
- Rationalizing experiment decisions
- Reporting incrementals

Analyzing the data

We'll now discuss each of these and provide some examples from published research.

Goal 2: Describing the Study

Acquiring the Data

Acquiring the data

refers to a writer's description of the collection and data-recording process. This strategy enables an author to illustrate how the data were obtained (e.g., via sampling, selecting, or measuring processes) and also what was done to the data (including, but not limited to, preparing, tabulating, or estimating the data). Here are two examples taken from published research articles:



Examples

- In the present study, 12 Australian university students of Japanese were recruited, who in turn invited their Japanese contacts to participate. **In total, data was collected from 30 participants, and some Japanese participants were contacts of more than one Australian participant.** In contrast to many previous studies, volunteers were not paired with NSs in order to complete tasks, but instead data was collected from participants in existing relationships.¹
- The high-quality fluorescent particles, typically used in microfluidics, generally provide high-quality particle images, with acceptable SNR up to high levels of defocusing, and are particularly well suited for this type of application. **In figure 2, the peak intensities and particle image diameters, obtained from different types of tracer particles, are shown as a function of their distance z from the in-focus plane.** The tracer particles are polystyrene latex spheres with diameters of $d_p = 1, 2, 5$ and $10 \text{ } \mu\text{m}$, fabricated by Microparticles GmbH.²

1. Pasfield-Neofitou, S. (2011). Online domains of language use: Second language learners' experiences of virtual community and foreignness. *Language Learning & Technology*, 15(2), 92-108.

2. Cierpka, C., Rossi, M., Segura, R., & Kähler, C. J. (2010). On the calibration of astigmatism particle tracking velocimetry for microflows. *Measurement Science and Technology*, 22(1), 015401.

Describing the Data

Describing the data typically follows the previous strategy of explaining how the data were acquired. When you describe data, you elaborate on features such as measurement units, scales, qualities, or quantities.

Consider these excerpts from published research articles:



Examples

- The relative quantification of the samples was determined using the Bio-Rad CFX Manager software, integrating primer efficiencies calculated from a standard curve. For the gene, the sample showing the highest intensity level was used as reference with a value of 1. **The final data result from averages of three biological replicates and at least two technical repetitions.**³
- **Age was weakly and typically not significantly related to performance on outcome measures at pre- and posttest and, therefore, was not included in analyses. Table 1 presents demographic and screening data, arranged by study condition and MD subtype. (We note that we conducted supplementary analyses to determine whether adding ESL, IQ, or WRAT Arithmetic altered the nature of the findings. Because none did, we did not include these variables as covariates in the analyses described below.)**⁴

Overall, the use of this strategy enables researchers to fully illustrate their data sample for the reader. This strategy is particularly important as a means of justifying the quality of your sample, so be sure to pay close attention to detail at this stage of your writing.

3. Tian, J., Shen, H., Zhang, J., Song, T., & Yao, Y. (2011). Characteristics of chalcone synthase promoters from different leaf-color *Malus crabapple* cultivars. *Scientia Horticulturae*, 129(3), 449-458.

4. Powell, S. R., Fuchs, L. S., Fuchs, D., Cirino, P. T., & Fletcher, J. M. (2009). Effects of fact retrieval tutoring on third-grade students with math difficulties with and without reading difficulties. *Learning Disabilities Research & Practice*, 24(1), 1-11.

Identifying Variables

The strategy of **identifying variables** distinguishes which parts of your data were manipulated or used to influence the findings. Some common labels include constant versus subject-to-change conditions or factors during the time the experiment was carried out. Here are two examples taken from published research articles:



Examples

- In a typical experiment, a range of 0.01-10.0 mL of ZnO NCs (1.22×10^{-11} to 1.22×10^{-8} mol) were added to 10 vials each containing 3.8×10^{-6} M (4.2×10^{-8} mol) 1-CO₂H in ethanol. **A control vial** had the same amount of 1-CO₂H as the other vials but contained 5 μ L of 0.100 M NMe₄OH $\cdot$ 4H₂O to deprotonate the molecule. Ethanol was added until all vials contained 11.0 mL.⁵
- Because of the marked differences between **nurture group and control samples** in the very few reported studies that have included control groups, this study adopted a highly formalised procedure for selecting controls. While this did not eliminate the almost unavoidable differences between **experimentals and controls** in a quasi-experimental study, it was successful in significantly reducing any differences.⁶

Now that you have sufficiently identified and described your variables, you can move on to explaining what you actually did to conduct the experiment: the methods/procedures.

Describing Experimental Study Procedures

Describing experimental study procedures describes what you did to cause an outcome related to or

5. Rossini, J. E., Huss, A. S., Bohnsack, J. N., Blank, D. A., Mann, K. R., & Gladfelter, W. L. (2011). Binding and static quenching behavior of a terthiophene carboxylate on monodispersed zinc oxide nanocrystals. *The Journal of Physical Chemistry C*, 115(1), 11-17.

6. Reynolds, S., MacKay, T., & Kearney, M. (2009). RESEARCH SECTION: Nurture groups: a large-scale, controlled study of effects on development and academic attainment. *British Journal of Special Education*, 36(4), 204-212.

leading to specific results. It also illustrates the steps you used and provides a description that is detailed enough for future replication of the study. You can accomplish this strategy by outlining what was done for the actual study or experiment in step-by-step actions. Here are two examples taken from published research articles:



Examples

- At the initial login, **participants were asked to record** their steps for 4 days over the following week.⁷
- The mold **was then attached** to the bottom pedestal of the test cell, the membrane **stretched** over the bottom end platen **and sealed** using two o-rings.⁸

When describing procedures in the Methods section, authors use both active and passive voice. Very frequently, the verbs in the active and passive voice are used in the past tense (as in the examples above). However, in some disciplines, authors may choose to use the present simple tense to describe the experimental steps of their study (e.g., *I exclude* small state-owned banks from the sample).

Describing Tools / Instruments / Materials / Equipment

Describing tools/instruments/materials/equipment explains the materials (physical or abstract) used in data acquisition or experimental procedures. This information is useful for the reader in case the study may be replicated by another researcher. Sometimes the overall goal of a sentence is to describe tools, but other times there are overarching goals. It must be noted that while the origin or nature of the tools/instruments/materials/equipment may be described, this strategy does not include the process of obtaining or creating them, nor does it explain how they were used or what specific actions were taken with them in the course of the study.

7. Booth, A. O., Nowson, C. A., & Matters, H. (2008). Evaluation of an interactive, Internet-based weight loss program: a pilot study. *Health Education Research*, 23(3), 371-381.

8. Alshibli, K. A., Batiste, S. N., & Sture, S. (2003). Strain localization in sand: plane strain versus triaxial compression. *Journal of Geotechnical and Geoenvironmental Engineering*, 129(6), 483-494.

It is also worth mentioning that this description of tools/instruments/materials/equipment may not only appear in the description of experimental procedures, but also when you are discussing other parts of the data acquisition or analysis process. Examples of this strategy are in the box below:



Examples

- **The basic liquid medium (BLM) used for the activation of the cultures consisted of** chicken feather meal 20; NaCl, 0.5; KH₂PO₄, 1.0 and K₂HPO₄, 6.0 at pH 7.5.⁹
- **The MLAT (Modern Language Aptitude Test) is** usually administered in two versions—full and short. Since **the short version contains** all sections relevant to vocabulary learning, it was the version selected for the current research.¹⁰

Note that in the first example, the past tense is used to describe materials specifically designed or chosen for the study and that may not be familiar to the readers. However, the present tense (used in the second example) can be used to describe standard or conventional tools or equipment that are likely to be familiar to the readers. Once the variables, procedures, and materials have been sufficiently explained, you will need to justify the decisions you made that contributed to the selection of them.

Rationalizing Experiment Decisions

Rationalizing experiment decisions provides reasoning or explanation for choices made in the experimental process (e.g., in data collection or preparation, experimentation, or tool selection). This strategy is useful for justifying choices, connecting choices to research purposes and questions, establishing credibility, and indicating the objective for certain experimental steps. The following examples illustrate this step:

9. Liang, J. D., Han, Y. F., Zhang, J. W., Du, W., Liang, Z. Q., & Li, Z. Z. (2011). Optimal culture conditions for keratinase production by a novel thermophilic *Myceliophthora thermophila* strain GZUIFR-H49-1. *Journal of Applied Microbiology*, 110(4), 871-880.

10. Nikolova, O. R. (2002). Effects of students' participation in authoring of multimedia materials on student acquisition of vocabulary. *Language Learning & Technology*, 6(1), 100-122.



Examples

- Moreover, **since one aim of the study was to investigate** students' impressions regarding the process enacted during the Role Play, **it was decided that** the same dimensions and indicators could be used to address this issue.¹¹
- Yield was not determined by combine harvesting **because of** the wide range of harvest maturity dates within the study.¹²

This strategy of providing a justification or rationale for your decisions is extremely important in making the research process transparent for your readers.

Reporting Incrementals

Reporting incrementals, the last potential strategy in Goal 2, reports the preliminary findings, results of observations, and/or measurements. It may serve as a way for the author to promote understanding of the next steps taken or choices made in the experiment. These incremental reports can clarify your methods and/or justify the use of a particular technique or procedure. This strategy results in a brief reporting of what occurred in the experimental process. It helps your readers understand why you completed the experimental procedures or made certain choices in a particular way. Examples of the reporting incrementals strategy are as follows:



Examples

- The final R- and R-free **values after data refinement** (details in the

11. Pozzi, F. (2011). The impact of scripted roles on online collaborative learning processes. *International Journal of Computer-Supported Collaborative Learning*, 6(3), 471-484.

12. Kahlon, C. S., Board, J. E., & Kang, M. S. (2011). An analysis of yield component changes for new vs. old soybean cultivars. *Agronomy Journal*, 103(1), 13-22.

Supplementary Methods) **were** 21.6% and 28.7%, respectively.¹³

- Although the same amounts of reactants were used to produce the 508 and 625 nm particles, slight differences in stirring speed **likely contributed to** the size variations.¹⁴

There is one important caveat for reporting incrementals; this strategy should not be confused with actual study results. This strategy is simply a small mention of incremental findings or observations that you believe to be noteworthy, and they may or may not be directly connected to the final study results.

Language Suggestions for Goal 2 Strategies

Some common vocabulary that is associated with this strategy includes the following, as noted in the [Academic Phrasebank](#):

13. Masterson, L. R., Cheng, C., Yu, T., Tonelli, M., Kornev, A., Taylor, S. S., & Veglia, G. (2010). Dynamics connect substrate recognition to catalysis in protein kinase A. *Nature Chemical Biology*, 6(11), 821-828.

14. Kramb, R. C., & Zukoski, C. F. (2008). A metastable van der Waals gel: Transitioning from weak to strong attractions. *Langmuir*, 24(14), 7565-7572.

Type of Language	Example
Sequence phrases	To begin this process, ... The first step in this process was to ... The second method used to identify X involved ...
Passive voice verbs	All participants were sent ... The data were normalized using ... Ethical approval was obtained from ...
Expressing purpose with <i>for</i>	For the attitude questions, a Likert scale was used. For the purpose of analysis, two segments were extracted from each ... For the estimation of protein concentration, 100 µL of protein sample was mixed with ...
Adverbs of manner	The medium was then aseptically transferred to a conical flask. A sample of the concentrate was then carefully extracted from ... The tubes were methodically collected by ...
Using + instruments	Data were collected using two high spectral resolution Xs. Semi-automated genotyping was carried out using X software and ... Using the X-ray and looking at the actual X, it was possible to identify ...

Linguistic research on language structure and use in Methods sections of research articles has shown common trends in the forms and structure of the section across disciplines. There is a predominant use of the present and present perfect tenses, verbs in the past passive and past active voice, and modifiers such as adjectives and adverbs. These common characteristics may work together to strengthen the author's claims by calling attention to the contributions of the current work and downplaying uncertainty perhaps arising in the attainment and analysis of data. Writers also may choose how to represent themselves in their writing. The personification of the authors is sometimes seen by the use of the pronouns "we," or "I," though the context and rationale for its use seem inconsistent among the disciplines.

Review

Now, let's practice applying our knowledge of the second goal of the methods section.



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<https://iastate.pressbooks.pub/isudp-2026-252/?p=200#h5p-20>

Excerpt A is from Biomaterials¹⁵ and Excerpt B is from the Journal of Retailing¹⁶.

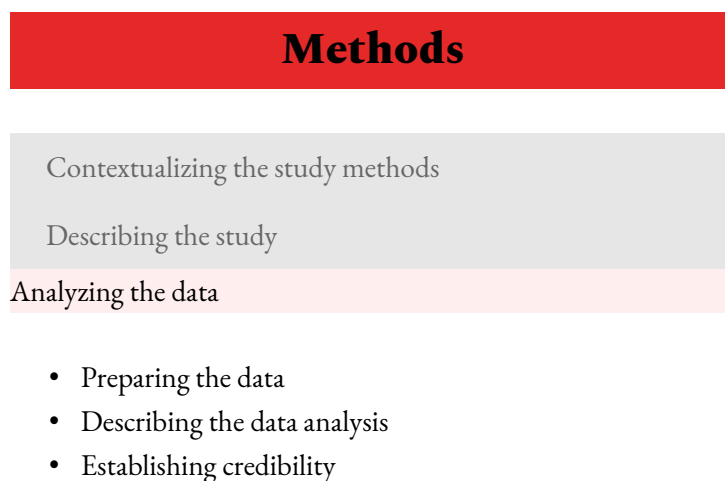
15. Du, J., Che, P., Wang, Z., Aich, U., & Yarema, K. (2011). Designing a binding interface for control of cancer cell adhesion via 3D topography and metabolic oligosaccharide engineering. *Biomaterials*, 32(23), 5427-5437.

16. Jensen, B.B. & Grunert, K.G. (2014). Price knowledge during grocery shopping: what we learn and what we forget. *Journal of Retailing*, 90(3), 332-346.

METHODS GOAL 3: ANALYZING THE DATA

The third goal of writing your Methods section, **Analyzing the Data**, aims to overview the data analysis. To do this, the author explains *how* the data have been analyzed (without describing the results of that analysis). Accomplishing this goal provides a preview of the central pieces of the research, including, but not limited to, objectives, questions/hypotheses, procedures/methods, and main results. Authors also make arguments about the value of the reported work in an effort to justify the need for addressing the niche and any previous attempts to provide solutions to problems or gaps in the literature.

The purpose of Goal 3 is to persuade your reader about the quality of the data analysis and make a claim that the study's procedures have led to valid and credible findings. As a reminder, this goal allows the writer to explain *how* the data have been analyzed (without describing the results of that analysis). Here are the **strategies** for Goal 3:



We'll now discuss each of these and provide some examples from published research.

Goal 3: Analyzing the Data

Preparing the Data

Preparing the data describes what was done to the data and how the data were prepared for analysis. This

strategy is used to explain data selection, collection, and preparation (e.g., sampling, screening, cleaning, inclusion/exclusion, correction). You will also mention any tools that you used to accomplish these processes. Also, you need to explain data manipulation (e.g., transforming, coding, tabulating, estimating) along with any tools you used. Below are two examples of the utilization of this strategy in published research:



Examples

- **For all variables, least squares means were generated and, when significant ($P < 0.05$) F values were observed, least squares means were separated with pairwise t-test (PDIFF option).¹**
- Each electronic nose measurement was associated with the average (one representative value) of the eight human panelists assessments. **The determination of the average pleasantness rating also involved trimming the data.** The data were scanned for values that did not support the general consensus.²

Although the examples show data that were *included* in the research, you may also mention which data were excluded from the analysis. The following are some examples from the [Academic Phrasebank](#) that you might consider using as sentence starters:

- Criteria for selecting the subjects were as follows:
- Publications were only included in the analysis if...
- The participants in this study were recruited from ...
- To identify X, the following parameters were used: ...
- The area of study was chosen for its relatively small ...
- Primary inclusion criteria for the X participants were ...
- Eligibility criteria required individuals to have received ...
- Five individuals were excluded from the study on the basis of ...
- A small sample was chosen because of the expected difficulty in obtaining ...

1. Sawyer, J. T., Apple, J. K., Johnson, Z. B., Baublits, R. T., & Yancey, J. W. S. Color Stability of Dark-cutting Beef Enhanced with Lactic Acid. *Arkansas*, 87.

2. Williams, A. L., Heinemann, P. H., Wysocki, C. J., Beyer, D. M., & Graves, R. E. (2010). Prediction of hedonic tone using an electronic nose and artificial neural networks. *Applied Engineering in Agriculture*, 26(2), 343-350.

- The subjects were selected on the basis of the degree of homogeneity of their ...
 - A comparison group of 12 male subjects without any history of X was drawn from a pool of ...
-

Describing the Data Analysis

Describing the data analysis provides a description of the actual analysis (with/without certain tools) in terms of how the data analysis was done and what procedures were used for analysis (e.g., statistical techniques, coding schemes, etc.). Consider the following examples from published research:



Examples

- For all variables, **least squares means were generated and, when significant ($P < 0.05$) F values were observed, least squares means were separated with pairwise t-test (PDIFF option).**³
 - Our paired survey from buyers and suppliers significantly reduces the single-side, single-informant related common method variance bias. **Before computing the average score from both sides, we also took steps recommended by Podsakoff and Organ (1986) and conducted a global factor analysis on items related to all predicting and criterion variables for each side.** No single factor emerges from the analysis and no one factor accounts for most of the covariance for all predicting and criterion variables, confirming the absence of the common method bias.⁴
-

3. Sawyer, J. T., Apple, J. K., & Johnson, Z. B. (2007). The impact of acidic marination concentration and sodium chloride on sensory and instrumental color characteristics of dark-cutting beef. *Arkansas Animal Science Department Report*, 92-95.

4. Liu, Y., Luo, Y., & Liu, T. (2009). Governing buyer-supplier relationships through transactional and relational mechanisms: Evidence from China. *Journal of Operations Management*, 27(4), 294-309.

Establishing Credibility

Establishing credibility helps you, the author, provide a rationale for the analysis and/or data processing and indicate statistical or other procedures employed to ensure credibility (e.g., reliability calculations). Implementing this strategy gives recognition to existing and/or pre-existing limitations and/or explains or interprets certain observations or measurements. Here are two examples taken from published research articles:



Examples

- **We only tentatively interpret** the A mar data here, as its determination **is complicated by uncertainties** associated with the partitioning of marine and terrestrial deposits in the macrostratigraphy database (**a subject of ongoing work**).⁵
- Lastly, MM5 is intended to be a **very conservative dissonance indicator, preventing potential misclassification of residents as mismatched as much as possible**.⁶

Review

Now, let's practice applying our knowledge of the third goal of the methods section.

5. Meyers, S. R., & Peters, S. E. (2011). A 56 million year rhythm in North American sedimentation during the Phanerozoic. *Earth and Planetary Science Letters*, 303(3-4), 174-180.

6. Schwanen, T., & Mokhtarian, P. L. (2005). What affects commute mode choice: neighborhood physical structure or preferences toward neighborhoods? *Journal of Transport Geography*, 13(1), 83-99.



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<https://iastate.pressbooks.pub/isudp-2026-252/?p=203#h5p-21>

Excerpt A is from the Journal of the Academy of Marketing Science⁷ and Excerpt B is from the Journal of Research in Special Educational Needs⁸.

7. Sadovnikova, A. & Pujari, A. (2017). The effect of green partnerships on firm value. *Journal of the Academy of Marketing Science*, 45(2), 251-267.

8. Cullen, M. A., Lindsay, G., & Dockrell, J. E. (2009). The role of the Connexions service in supporting the transition from school to post-16 education, employment training and work for young people with a history of specific speech and language difficulties or learning difficulties. *Journal of Research in Special Educational Needs*, 9(2), 100-112.

SUMMARY

We have now reviewed the three communicative goals and a variety of strategies of the Methods section. It is important to note that these goals are expected in all Methods sections that are part of empirical research articles, regardless of the employed methodology type (e.g., case study, experiment, etc.). The image below provides a snapshot of strategies per goal we presented in this chapter that writers can select from:

Methods

Contextualizing the study methods

- Referencing previous works
- Providing general information
- Identifying the methodological approach
- Describing the setting
- Introducing the subjects/participants
- Rationalizing pre-experiment decisions

Describing the study

- Acquiring the data
- Describing the data
- Identifying variables
- Describing experimental/study procedures
- Tools/instruments/materials/equipment
- Rationalizing experiment decisions
- Reporting incrementals

Analyzing the data

- Preparing the data
- Describing the data analysis
- Establishing credibility



Key Takeaways

There are 3 goals for Methods sections:

1. **Contextualizing the study's methods:** Contextualize the procedures you followed to conduct the research and explain the conditions in which the study occurred.
2. **Describing the study:** Include details of what you actually did to conduct the research. Explain how, when, and where you obtained the data.
3. **Analyzing the data:** Give an overview the data analysis including how the data have been analyzed

Remember to explore published research article within your field! Rhetorical choices are often discipline- and journal-dependent, making it important to notice the similarities and differences in the way they are achieved. Here are a few important points:

- do not follow a linear order to organize the goals and their strategies;
- might use most of the space in the section to accomplish particular goals/strategies;
- often do not include all strategies of a goal;
- combine two or more strategies of the same goal or different goals in one sentence.

These choices of order, frequency, selection, and combination are typically based on the employed research methodology, discipline, and journal.

Let's try one final exercise to practice applying your knowledge of Introductions.

Review



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<https://iastate.pressbooks.pub/isudp-2026-252/?p=598#h5p-22>

Excerpt A is from the *Journal of Research in Special Educational Needs*¹, Excerpt B is from the *Journal of Learning and Instruction*², Excerpt C is from the *Journal of Business Research*³, and Excerpt D is from the *Meat Science* journal⁴.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=598#h5p-23>

The excerpt is from the *Journal of Marketing Research*⁵.

-
1. Ross-Hill, R. (2009). Teacher attitude towards inclusion practices and special needs students. *Journal of Research in Special Educational Needs*, 9(3), 188-198.
 2. Rotgans, J. I., & Schmidt, H. G. (2011). Situational interest and academic achievement in the active-learning classroom. *Learning and Instruction*, 21, 58-67.
 3. Black, I. & Veloutsou, C. (2017). Working consumers: Co-creation of brand identity, consumer identity and brand community identity. *Journal of Business Research*, 70, 416-429.
 4. Danilović, B., Joković, N., Petrović, L., Veljović, K., Tolinački, M., & Savić, D. (2011). The characterisation of lactic acid bacteria during the fermentation of an artisan Serbian sausage (Petrovska Klobása). *Meat Science*, 88(4), 668-674.
 5. Boyd, D.E., Chandy, R.K. & Cunha Jr, M. (2010). When do chief marketing officers affect firm value? A customer power explanation. *Journal of Marketing Research*, 47(6), 1162-1176.

DRAFTING YOUR METHODS

Draft Your Method Section



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<https://iastate.pressbooks.pub/isudp-2026-252/?p=608#h5p-43>

We'll now move on to the next section of empirical research articles: The Results.

CHAPTER 4: WRITING THE RESULTS



Learning Objectives

After completing this chapter, you should be able to:

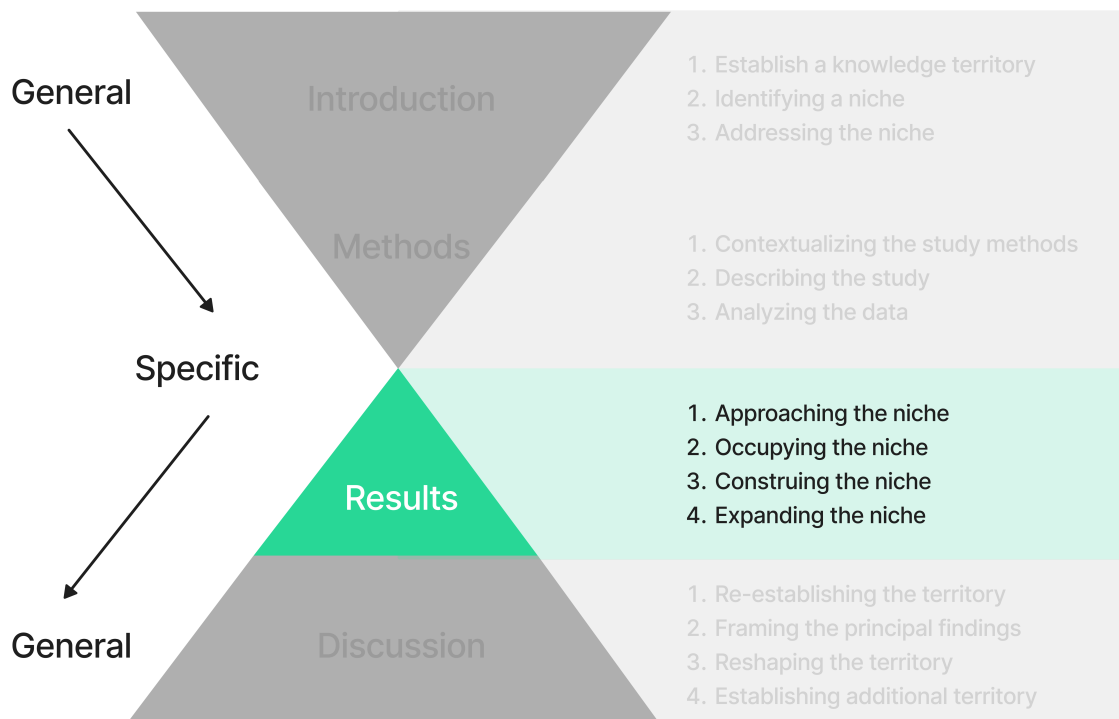
- Articulate the importance of the Results section.
- Recognize the communicative goals of the Results.
- Apply strategies to achieve each of the four communicative goals.
- Optimize the language for writing your Results.
- Evaluate your Results section.

GOALS OF THE RESULTS SECTION

The third section of an empirical research article is the **Results**. Similar to the preceding section (the Methods), the scope of the Results is narrow. Writers communicate specific information that achieves four communicative goals in Results sections:

1. **Approaching the niche**
2. **Occupying the niche**
3. **Construing the niche**
4. **Expanding the niche.**

For writers combining the Results with the Discussion as one section, all four goals are required, the focus of Goals 1 and 2 is on reporting the findings and Goals 3 and 4 on commenting on these findings. However, depending on the field and journal, some Results are a stand-alone section separate from the discussion, in which case authors may or may not employ Goals 3 and 4. In this e-book, we have separated those two sections so that the goals and strategies can be more easily explained, clarified, and exemplified.



It is important to note that the word ‘niche’ might seem familiar to you because we used the term in [Chapter 2: Writing the Introduction](#). The meaning of this word represents the same concept in this chapter. The niche is the area of the research where you have identified a need, problem, or gap. Your Introduction identified and addressed the niche, your Methods section provided the procedures for investigating that niche, and now, in the Results section, you will provide answers to your research questions by reporting your findings.

In the coming chapter sections, we will take present the strategies accompanying each of the Results goals.



Warm-Up

- What types of information does the reader expect to see in the Results section?
- Which types of information could contribute to achieving each communicative goal?

RESULTS GOAL 1: APPROACHING THE NICHE

The first goal in the Results section is **Approaching the Niche**. The major aim of this goal is to show a progression from all the other preceding parts (i.e., Introduction and Methods) to the Results, or findings. This goal helps create a logical connection between general information in the field and your methods to your findings. This connection is often made by repeating relevant background or study-specific information as a preview to your results. As you are writing this part of the research article, you'll be considering what you've already written about in the literature review in the Introduction (specifically, the niche) while emphasizing the choices you made regarding methodology.

The similarity in the names of the goals in the Introduction section and the Results section is no coincidence. It is very important that you avoid simply reporting the results without linking them to the niche that you established at the very beginning of the paper. This is not a place to dump your findings into the paper; instead, you must use the Results to show how the gap is being filled with your study findings, possibly re-emphasizing some particular aspects of your Introduction and the Methods sections using the following **strategies**:

Results

Approaching the Niche

- Providing general information
- Restating study specifics
- Justifying study specifics

Occupying the Niche

Construing the Niche

Expanding the Niche

Think of Goal 1 as a bridge between your Results and the previous sections of the research report. We'll now discuss each of the Goal 1 strategies and provide some illustrative examples of Goal 1 writing from published research.

Providing General Information

You can use the **providing general information** strategy to provide context for the study and the results inside a specific “territory” (knowledge space). This is your opportunity to begin situating your findings within the larger “territory” or body of literature that is already available. Providing general information allows you to recall information from your Introduction, where you justified the need for the study. You may also use this step to refer back to methods, techniques, processes, or practices commonly used in your field. This strategy also allows you to orient your readers in a way that makes it easier for them to navigate your results. Here are two examples of providing general information taken from published research articles:



Examples

- Monitoring **results are presented by station in the following section**. The monitoring **data are divided into** pre-, during-, and post-construction periods. **These periods were determined by observation** and are somewhat arbitrary, as construction projects are a continuum with no distinct breaks.¹
- **This section presents results for** our various test corpora and classifiers. **We will first verify Wagner et al.’s (2007) finding that** combining features of different methods helps.²

It might be helpful to think of this strategy as a road sign when driving. Road signs help you determine where you are going. Similarly, providing general information can help indicate the order of information you are presenting as results or by highlight noteworthy aspects on which readers should focus.

Restating Study Specifics

Restating study specifics is a common strategy that you can use to restate various characteristics of your

1. Line, D. E., Shaffer, M. B., & Blackwell, J. D. (2011). Sediment export from a highway construction site in central North Carolina. *Transactions of the ASABE*, 54(1), 105-111.

2. Wagner, J., Foster, J., & van Genabith, J. (2009). Judging grammaticality: Experiments in sentence classification. *Calico Journal*, 26(3), 474-490.

methodology, such as the overall approach, research questions, and/or hypotheses. The purpose of restating study specifics is to connect them to your results. Don't forget, readers need to be able to understand the results, and reminding them briefly of how those results were obtained can be a valuable technique to aid that understanding. Sometimes this strategy is accomplished by pointing to visual representations of procedures or approaches (for example, graphs or tables). Here are two examples taken from published research articles:



Examples

- **We hypothesized that** JM6 acts as a prodrug and would be metabolized under acidic conditions in the gut to slowly release Ro 61-8048 and thereby provide long-lasting inhibition of KMO (Figures 2A and 2B). **To investigate** the pharmacokinetic properties of JM6, **we treated wild-type (WT) mice with** a single high dose of JM6 (300 mg/kg p.o.) **and measured** JM6 and Ro 61-8048 in plasma, brain, muscle, and liver by liquid chromatography/mass spectrometry (LC/MS) 5 hr after administration.³
- In Table 2, **we test for the effects of** culture on individual preferences for redistribution and explore the effects of traditional economic determinants of preferences . **A one-unit increase in the mean preference for redistribution in the individual's country of birth, calculated on a 1 to 5 scale,** is associated with a 0.36 unit increase in the individual's own preference for redistribution (column 1). This effect is highly statistically significant ($t=4.08$).⁴

3. Zwilling, D., Huang, S. Y., Sathyaikumar, K. V., Notarangelo, F. M., Guidetti, P., Wu, H. Q., ... & Muchowski, P. J. (2011). Kynurenine 3-monooxygenase inhibition in blood ameliorates neurodegeneration. *Cell*, 145(6), 863-874.

4. Luttmer, E. F., & Singhal, M. (2011). Culture, context, and the taste for redistribution. *American Economic Journal: Economic Policy*, 3(1), 157-79.

Restating the study specifics helps reiterate key information that the reader may have forgotten (or skipped altogether) from previous sections of the paper and helps clarify the connections between the motivations, methods, and results.

Justifying Study Specifics

Justifying study specifics is the final Goal 1 strategy. You can provide justifications for study-related choices as a way of increasing the credibility of your results. If you remember back to the Methods section, authors try to anticipate criticism and make their methods as sound and credible as possible. In the Results section, criticism is anticipated by providing sound reasoning or rationale for certain study choices and reiterating the importance of decisions made along the way, from the literature to the justification of the study, to the research questions, to the methods, and now, finally, to your results. By justifying study specifics, you are answering questions from your readers before they are asked.

Below are a few examples excerpted from published reports of research with the relevant language **bolded** to illustrate how the words/phrases enact the strategy, which then works to accomplish Goal 1:



Examples

- **This flow was chosen because** it has a streamwise component, in the x-direction, that varies over the cross section but does not provide flow in the y- or z-directions.⁵
- Previous studies results showed that 25.0 μ M NAA was the lowest concentration among the three auxins tested that resulted in 100% rooting. **Thus, 25.0 μ M NAA was selected as the most effective treatment and used in all further experiments.**⁶

The use of this strategy is key because of the connection it provides from the beginning of your manuscript to the point where you realize the main objective: the Results! If a reader has read your entire report up to the

5. Cierpka, C., Rossi, M., Segura, R., & Kähler, C. J. (2010). On the calibration of astigmatism particle tracking velocimetry for microflows. *Measurement Science and Technology*, 22(1), 015401.

6. Bag, N., & Palni, M. (2010). A two-step procedure for in vitro rooting of micropropagated tea [*Camellia sinensis* L.(O) Kuntze] microshoots. *The Journal of Horticultural Science and Biotechnology*, 85(3), 197-204.

Results, they have probably forgotten some important information they might need to fully understand your findings. On the other hand, some readers only skim research articles, and so they may arrive at the Results section with only a vague understanding of what you set out to accomplish. Employing this strategy is a way to guide your reader to a better comprehension of the study from an overarching perspective.

Review

Now, let's practice applying our knowledge of the first goal of the Results section.



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<https://iastate.pressbooks.pub/isudp-2026-252/?p=215#h5p-26>

Excerpt A is from the Journal of Marketing Research⁷ and Excerpt B is from the Journal of Operations Management⁸.

7. Chan, E., & Sengupta, J. (2010). Insincere flattery actually works: A dual attitudes perspective. *Journal of Marketing Research*, 47(1), 122-133.

8. Bozarth, C., Warsing, D., Flynn, B., & Flynn, E. (2009). The impact of supply chain complexity on manufacturing plant performance. *Journal of Operations Management*, 27(1), 78-93.

RESULTS GOAL 2: OCCUPYING THE NICHE

Another goal of the Results section is to introduce new information about the niche (the specialty area or territory that you established in the Introduction and that you are now returning to in the Results section). This new knowledge represents information that was previously insufficient or lacking in the research area. Authors accomplish Goal 2 of the Results, **Occupying the Niche**, by presenting the results of their research in explicit and informative ways. Relevant supporting evidence for your findings may also be presented. Results from your study may be presented via written text or in graphical or pictorial form in charts, tables, equations, images, and/or diagrams that act as visual aids. Presenting the study's results in multiple formats may help your readers understand your study's findings in a variety of ways (e.g., visual, spatial, textual).

It is important to clarify that for this goal, you are simply presenting the results as information rather than writing your beliefs about, interpretations of, or evaluations of them. You should not comment on or discuss the findings as you work to accomplish Goal 2. All evaluative comments occur either later in the Results section (if Results and Discussion sections are combined) or in the Discussion section. Goal 2, Occupying the Niche, is the place for you to introduce your readers to the new knowledge that has been gained from your research. Since you have already established a gap in the introduction, you will use this opportunity to progress from pointing out a gap to *filling* that gap. There are several **strategies** you can use to help you successfully achieve this goal.

Results

Approaching the niche

Occupying the niche

- Reporting specific results
- Indicating alternative presentation of results

Construing the niche

Expanding the niche

We'll now discuss each of these and provide some examples from published research.

Reporting Specific Results

Reporting specific results is a strategy used to introduce the quantitative or qualitative results of your study. Employing this strategy well also includes making connections between the results and your original goals, research questions, and/or hypotheses as written about in your Introduction. You can report specific results in narrative form (i.e., in sentences within paragraphs), in numerical form (e.g., tables and equations), or in graphical form (e.g., figures). Here are two examples taken from published research articles:



Examples

- The emission spectra of the ZnO NCs **displayed** the characteristic green emission ($\lambda_{\text{max}} \sim 520 \text{ nm}$).¹
- Concurrently, **a significant increase in crop phytotoxicity was observed** for both glyphosate- susceptible maize and soybean plants at 72 and 192 HAT.²

Although these examples are both relatively short, the decision about how much detail to provide can depend on a number of factors including common practices within an individual writer, journal, or discipline.

Because the presentation of results can become quite complex, you will need to distinguish between what you have accomplished (your methods) and what you found (your findings). As you are moving between your various findings, you might find it useful to use some of these suggestions from the [Academic Phrasebank](#):

- If we now turn to ...
- 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 ...

-
1. Rossini, J. E., Huss, A. S., Bohnsack, J. N., Blank, D. A., Mann, K. R., & Gladfelter, W. L. (2011). Binding and static quenching behavior of a terthiophene carboxylate on monodispersed zinc oxide nanocrystals. *The Journal of Physical Chemistry C*, 115(1), 11-17.
 2. Zelaya, I. A., Anderson, J. A., Owen, M. D., & Landes, R. D. (2011). Evaluation of spectrophotometric and HPLC methods for shikimic acid determination in plants: models in glyphosate-resistant and-susceptible crops. *Journal of Agricultural and Food Chemistry*, 59(6), 2202-2212.

Indicating an Alternative Presentation of Results

Indicating an alternative presentation of results allows a writer to point out and/or summarize the results in a more visual form. When you use this strategy, you'll refer to the visuals to help guide the reader to a more complex view of the results. This strategy encourages a better understanding of the results as they are presented in alternative form as a supplement to the report itself, which relies on text (words, phrases, sentences, etc.). Here are two examples taken from published research articles:



Examples

- Similarly, **Figure 5B represents** the log10 of the ratio between the gene expression levels at T2idl, T4idl, or T6idl and the expression of the genes at T0idl.³
- **Figure 3 illustrates** the Hybrid tom and hen turkey growth performance during the one-year monitoring period.⁴

Indicating an alternative presentation of results provides a means for authors to showcase their findings outside of the written content of the article. By including additional forms of the findings, you are adding to the specificity and level of detail of the results, which helps readers more accurately comprehend your findings.

The [Academic Phrasebank](#) provides a list of sentence starters that would indicate the use of this strategy. Here are a few examples:

- Table 1 shows/compares/presents/provides ...
 - an overview of ...
 - the experimental data on X.
 - the summary statistics for ...
- Figure 1 illustrates/presents/compares/summarizes ...
 - some of the main characteristics of ...
 - the difference in the two groups of ...
 - the results of ...

3. Keech, O., Pesquet, E., Gutierrez, L., Ahad, A., Bellini, C., Smith, S. M., & Gardeström, P. (2010). Leaf senescence is accompanied by an early disruption of the microtubule network in Arabidopsis. *Plant Physiology*, 154(4), 1710-1720.

4. Li, H., Xin, H., Burns, R. T., Jacobson, L. D., Noll, S., Hoff, S. J., Harmon, J. D., Koziel, J. A., & Hetchler, B. P. (2011). Air emissions from tom and hen turkey houses in the US Midwest. *Transactions of the ASABE*, 54(1), 305-314.

Review

Now, let's practice applying our knowledge of the second goal of the results section.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=218#h5p-27>

Excerpt A is from the *Academy of Management Journal*⁵ and Excerpt B is from the *Journal of Learning and Instruction*⁶.

5. Flynn, F., & Wiltermuth, S. (2010). Who's with me? False consensus, brokerage, and ethical decision making in organizations. *Academy of Management Journal*, 53(5), 1074-1089.

6. Lam, S., Cheng, R. W., & Choy, H. C. (2010). School support and teacher motivation to implement project-based learning. *Learning and Instruction*, 20, 487-497.

RESULTS GOAL 3: CONSTRUING THE NICHE

The next goal in the Results section is called **Construing the Niche**. The main aim of this goal is to comment on and frame the results of the current study. This commentary on the results helps to explain the findings and develop a reader's understanding of how the findings relate to the other literature in the discipline. You would typically use this goal *after* a report of findings because it is a prime opportunity to evaluate how the presented results fit in the pre-existing literature. While in most other sections, we have pointed out that there is no set order to the goals and strategies, in the case of Results Goals 2 and 3, it is the norm to find them in a particular order. In Goal 2, you first simply report the results, and then in Goal 3, you follow that report with attempts to interpret the results in relation to what has occurred in the study and what has been reported in other relevant research in the discipline. To sum up, Construing the Niche allows authors to describe *and* evaluate the reported results.

It must be noted that Goal 3 may or may not appear in the Results section of a research manuscript. If the manuscript is organized with the Results and Discussion sections combined, then Goal 3 will be included. However, if the Results section and Discussion section are separate, the author may discuss the results in later sections of the manuscript, meaning Goal 3 may not be present in the Results section at all.

Results

Approaching the niche

Occupying the niche

Construing the niche

- Comparing the results with literature review
- Accounting for results
- Explicating results
- Relating to expectations
- Acknowledging limitations

Expanding the niche

We'll now discuss each of these **strategies** and provide some examples from published research.

Comparing Results with the Literature Review

Comparing results with the literature review is a strategy where authors compare the results of their current study with reported findings, theoretical beliefs, and/or previously stated assumptions or predictions in their discipline. In other words, authors must attempt to match what they wrote about in the Introduction in order to underscore similarities and/or differences between their research findings and previous research findings. This strategy is also an opportunity to support explanations and/or claims with what is known from previous research, show how the results relate to the body of existing knowledge on the topic of current research and strengthen the credibility of your findings. Here are two examples of how you can accomplish this step, with the specific language **bolded** to show how language can be used to enact this strategy:



Examples

- **These observations are consistent with previous researchers' findings that** bond order is independent of the $\delta^{18}\text{O}$ of water and the $\delta^{13}\text{C}$ of dissolved inorganic carbon (Schauble et al., 2006). $10.^1$
- The short action time of 0.4s estimated based on the micro-PIV measurements **was found to agree well with the value reported by Demuren et al. (2009).** $10.^2$

Note that both examples have cited relevant literature with which the authors are comparing their findings. Also, the [Academic Phrasebank](#) provides this list of suggested ways to report findings that are related to previous research:

Reporting findings in line with previous research:

1. Tripathi, A. K., Thiagarajan, N., Eagle, R., Gagnon, A. C., Eiler, J. M., & Bauch, H. A. (2009, December). Equilibrium ^{13}C - ^{18}O Isotope Signatures and 'Clumped Isotope' Thermometry in Foraminifera and Coccoliths. In *AGU Fall Meeting Abstracts* (Vol. 2009, pp. PP31B-1340).
2. Wang, B., Demuren, A., Gyuricsko, E., & Hu, H. (2011). An experimental study of pulsed micro-flows pertinent to continuous subcutaneous insulin infusion therapy. *Experiments in Fluids*, 51(1), 65-74.

- Several reports have shown that ...
- As mentioned in the literature review, ...
- Prior studies that have noted the importance of ...
- Very little was found in the literature on the question of ...
- Previous studies evaluating X observed inconsistent results on whether ...
- A strong relationship between X and Y has been reported in the literature.
- In reviewing the literature, no data was found on the association between X and Y.
- These factors may explain the relatively good correlation between X and Y.
- It may be that these participants benefitted from ...
- The observed correlation between X and Y might be explained in this way: ...

Accounting for Results

Accounting for results reflects on the nature of your study's results to point out what may have contributed to your results or outcomes and suggest reasons for, hypotheses about, speculations for, and/or assumptions that may account for certain findings. By using this strategy, you are working to justify the basis of the results. Consider the following examples of how you can accomplish this strategy, with the specific language **bolded** to highlight important language:



Examples

- Thus, **it is likely that the in vivo visualization of the polymerized MTs was unbiased**, despite the construct being driven by a strong promoter.³
- The discrepancy of the downtime NH₃ ER (0.14 vs. 0.88 g d⁻¹ bird⁻¹) **may have been a result of** differences in litter source (rye hull vs. shavings) and clean-out practices, such as the extent of caked litter removal, tilling, and rebedding.⁴

3. Keech, O., Pesquet, E., Gutierrez, L., Ahad, A., Bellini, C., Smith, S. M., & Gardeström, P. (2010). Leaf senescence is accompanied by an early disruption of the microtubule network in Arabidopsis. *Plant Physiology*, 154(4), 1710-1720.

4. Li, H., Xin, H., Burns, R. T., Jacobson, L. D., Noll, S., Hoff, S. J., ... & Hetchler, B. P. (2011). Air emissions from tom and hen turkey houses in the US Midwest. *Transactions of the ASABE*, 54(1), 305-314.

There are two important points to note about the examples: (1) this strategy can be completed with or without referencing previous research; (2) writers will often use hedging techniques with this strategy.

Note:

What is hedging? Hedging refers to how a writer expresses certainty or uncertainty. Often in academic writing, a writer may not be sure of the claims that are being made, or perhaps the ideas are good, but the evidence is not very strong. It is common, therefore, to use cautious language that indicates uncertainty (known as hedging language).⁵

There are two primary language “tools” that writer’s use to indicate they are hedging:

1. Adjectives and adverbs of likelihood as in the first example (e.g., *likely*)
2. Modal verbs as in the second (e.g., *may have been*)

The [University of Bristol’s website](#) (referenced above) provides a list of these tools and even has an exercise where you can test yourself on how well you understand them.

Explicating Results

Explicating results is another strategy that helps to explain the reported results in the context of the study. Writers accomplish this by interpreting, inferencing, and possibly citing literature in order to give meaning to the results, make immediate deductions from the results, provide logical interpretations, and prepare for further discussion of the results outside the context of their study. Let’s examine some examples of how you can use this strategy in your writing (specific language **bolded**):

5. [University of Bristol website](#).



Examples

- Indeed, **this finding suggests that** strength of ties, per se makes little difference, at least in our context, in the extent to which bridging promotes individual innovativeness.⁶
- **These results indicated that** SsoPox immobilized on nanoalumina membranes **can indeed attenuate the production of** *P. aeruginosa* quorum- sensing-associated virulence factors.⁷

Relating to Expectations

Relating to expectations is used to reason about the anticipated or unanticipated research findings and/or observations. This step is typical when you want to point out expected or unexpected results, express attitudes about findings (often with regards to surprising or unsatisfactory results), or connect the findings to original hypotheses, possibly stating whether or not they are confirmed or supported. Below are two examples of writing that uses this strategy to accomplish Goal 3 in the Results section:



Examples

- **One of the most striking findings is that** all participants spent some time on both kinds of problems (i.e., there were neither floor nor ceiling effects), **and there was considerable variability in** time spent on both types of problems.⁸
- **Perhaps the most intriguing finding** of our single-crystal X-ray analyses comes from

6. Tortoriello, M., & Krackhardt, D. (2010). Activating cross-boundary knowledge: The role of Simmelian ties in the generation of innovations. *Academy of Management Journal*, 53(1), 167-181..

7. Ng, F. S., Wright, D. M., & Seah, S. Y. (2011). Characterization of a phosphotriesterase-like lactonase from *Sulfolobus solfataricus* and its immobilization for disruption of quorum sensing. *Applied and Environmental Microbiology*, 77(4), 1181-1186.

8. Forbes, C. E., & Schmader, T. (2010). Retraining attitudes and stereotypes to affect motivation and cognitive capacity under stereotype threat. *Journal of Personality and Social Psychology*, 99(5), 740.

the location of the protons in compound.⁹

The [Academic Phrasebank](#) provides a list of sentence starters that would indicate the use of this strategy. Here are a few examples:

- Interestingly, the X was observed to ...
- This result is somewhat counterintuitive.
- Interestingly, this correlation is related to ...
- The more surprising correlation is with the ...
- Surprisingly, only a minority of respondents ...
- The most surprising aspect of the data is in the ...
- The correlation between X and Y is interesting because ...
- The most striking result to emerge from the data is that ...
- Interestingly, there were also differences in the ratios of ...
- The single most striking observation to emerge from the data comparison was ...
- This is a/an (surprising/significant/interesting/remarkable/unexpected/disappointing) (result/outcome).

Acknowledging Limitations

Acknowledging limitations is important in any study in order to justify what went wrong in the study, avoid over-generalizations about the study's findings, anticipate potential criticism from other scholars in the field, and possibly transition to recommendations for future research.



Examples

- **It was not possible, however, to conclude** from the derived s-value what the molar

9. Richards, G. J., Hill, J. P., Subbaiyan, N. K., D'Souza, F., Karr, P. A., Elsegood, M. R., ... & Ariga, K. (2009). Pyrazinacenes: aza analogues of acenes. *The Journal of Organic Chemistry*, 74(23), 8914-8923.

mass of this species is due to uncertainties of hydrodynamic shape and because the reaction boundary of a rapidly interacting system always sediments slower than the sedimentation coefficient of the complex species.¹⁰

- **Due to the unexpected low bird number (an inadvertent error** during bird transfer from the brooder barn to the grower barn) and considerable bird number changes of flock 1 at the tom site, **data for one entire investigated flock had to be excluded** from the ER assessment, **as they were not representative** of natural flocking patterns.¹¹

Review

Now, let's practice applying our knowledge of the third goal of the results section.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=221#h5p-28>

Excerpt A is from the *Earth and Planetary Science Letters*¹² and Excerpt B is from the *Journal of Learning and Instruction*¹³.

10. Barda-Saad, M., Shirasu, N., Pauker, M. H., Hassan, N., Perl, O., Balbo, A., ... & Samelson, L. E. (2010). Cooperative interactions at the SLP-76 complex are critical for actin polymerization. *The EMBO Journal*, 29(14), 2315-2328.

11. Li, H., Xin, H., Burns, R. T., Jacobson, L. D., Noll, S., Hoff, S. J., ... & Hetchler, B. P. (2011). Air emissions from tom and hen turkey houses in the US Midwest. *Transactions of the ASABE*, 54(1), 305-314.

12. Harding, I., Charles, A., Marshall, J., Pälike, H., Roberts, A., Wilson, P., Jarvis, E., Thorne, R., Morris, E., & Moremon, R. (2011). Sea-level and salinity fluctuations during the Paleocene–Eocene thermal maximum in Arctic Spitsberge. *Earth and Planetary Science Letters*, 303(1), 97-107.

13. Rotgans, J. I., & Schmidt, H. G. (2011). Situational interest and academic achievement in the active-learning classroom. *Learning and Instruction*, 21, 58-67.

RESULTS GOAL 4: EXPANDING THE NICHE

The final goal in the Results section is called **Expanding the Niche**. The main aim of Goal 4 is to further develop the evaluations of the results that come from Goal 3. This expanded commentary helps to relate your current study to the broader context of the discipline. Like Goal 3, Goal 4 may or may not appear in the Results section. If your paper is organized with the Results and Discussion sections combined, Goal 4 is more likely to appear. Nevertheless, if the Results section and Discussion section are separate, Goal 4 may not appear in the Results but would be in the Discussion section instead.

Results

Approaching the niche

Occupying the niche

Construing the niche

Expanding the niche

- Generalizing results
- Stating the value
- Noting implications
- Proposing directions

We'll now discuss each of these and provide some examples from published research.

Generalizing Results

Generalizing results infers, or deduces meaning, from results and develops general claims or conclusions. Authors typically generalize results by summarizing or synthesizing major findings or making deductions from the findings to broaden the scope of specific results, expand the meaning of the principle findings outside the framework of the study, or deliberate on (consider) the generalizability, transferability, and/or validity of the results. Here are two examples of how you can accomplish this strategy:



Examples

- In conclusion, **through the separate experiments, we determined that** the addition of 1-CO₂H to an ethanol solution of zinc acetate **does not result in** quenching of the emission.¹
- Because of their disabilities, combat veterans have trouble working, which leads them to stop looking for work and leave the labor force. **This is further evidence that** combat veterans experience direct cumulative disadvantage. Figure 3 presents predicted probabilities of disability by age and combat status, demonstrating that combat veterans were somewhat more likely than non-veterans and much more likely than non-combat veterans to be disabled throughout the work life.²

Stating the Value

Stating the value is another important strategy in Goal 4. You can use this strategy to demonstrate the noteworthiness, or importance, of your study by pointing out the most relevant findings. By employing this strategy, authors can advocate for the importance of their results and/or the study as a whole and can highlight their specific contribution[s] to the discipline. Consider the following examples:



Examples

- In an historical context, **these findings are especially significant in that** local governments were the most vehement opponents of CAMA, and especially its local planning requirements, when the statute was enacted some 25 years ago (Heath, 1974).³

1. Rossini, J. E., Huss, A. S., Bohnsack, J. N., Blank, D. A., Mann, K. R., & Gladfelter, W. L. (2011). Binding and static quenching behavior of a terthiophene carboxylate on monodispersed zinc oxide nanocrystals. *The Journal of Physical Chemistry C*, 115(1), 11-17.

2. MacLean, A. (2010). The things they carry: Combat, disability, and unemployment among US men. *American Sociological Review*, 75(4), 563-585.

3. Heath, J. (1974). The impact of the Civil Rights Act of 1964 on the urban South. *American Sociological Review*, 39(1), 1-15.

- **The most noteworthy finding is that** GEB24 a variety well known for all filled spikelets and Jaya—also known for good grain filling, exhibited high AGPase activity until 20 dpa. In contrast, in the hybrid CoRH2, known to have high number of spikelets but a significant number being unfilled, the AGPase activity was lower and dropped after 15 dpa.⁴

The following are some examples from the [Academic Phrasebank](#) that you might consider using as sentence starters to state the value of your research:

- What stands out in the results is ...
- It is apparent from these results that ...
- The most interesting aspect of the findings is ...
- What is striking about the results is ...
- What is interesting about the outcomes is that ...
- This finding is quite revealing in several ways.

Noting Implications

Noting implications informs readers of the potential implications and/or application of the results and/or the entire study. This strategy helps you explain how your results could be applied more broadly to research, practice, theory, etc. in the discipline, show the larger impact of the results and/or study beyond the current work, and point out possible consequences of either the findings or of the study itself. The examples below illustrate this strategy in use.

3. Norton, R. K. (2005). More and better local planning: State-mandated local planning in coastal North Carolina. *Journal of the American Planning Association*, 71(1), 55-71.

4. Devi, T. A., Sarla, N., Siddiq, E. A., & Sirdeshmukh, R. (2010). Activity and expression of adenosine diphosphate glucose pyrophosphorylase in developing rice grains: Varietal differences and implications on grain filling. *Plant Science*, 178(2), 123-129.



Examples

- With the added advantage of inclusion of only those lines maturing in the target area of its use, **this panel will be an excellent resource for future association studies.**⁵
- In summary, the micro-PIV measurements suggest that **the theoretical solution** for a fully developed laminar channel flow expressed in Eq. 1 **can be used to effectively** estimate the flow velocity distribution inside the square microchannel even though the micro-flow was in transient state during the flow decay process.⁶

Here are some examples from the [Academic Phrasebank](#) that you might consider using to note the implications of your research:

- It can therefore be assumed that the ...
- It can therefore be assumed that the ...
- An implication of this is the possibility that ...
- The present study raises the possibility that ...
- One of the issues that emerges from these findings is ...
- Some of the issues emerging from this finding relate specifically to ...
- These findings may help us to understand ...
- This finding, while preliminary, suggests that
- This finding has important implications for developing ...
- This observational study suggests that a diet rich in X may help prevent ...
- These findings raise intriguing questions regarding the nature and extent of ...
- This combination of findings provides some support for the conceptual premise that ...

5. Hansey, C. N., Johnson, J. M., Sekhon, R. S., Kaeppler, S. M., & De Leon, N. (2011). Genetic diversity of a maize association population with restricted phenology. *Crop Science*, 51(2), 704-715.

6. Wang, B., Demuren, A., Gyuricsko, E., & Hu, H. (2011). An experimental study of pulsed micro-flows pertinent to continuous subcutaneous insulin infusion therapy. *Experiments in Fluids*, 51(1), 65-74.

Proposing Directions

Proposing directions is another strategy that expert research writers use to accomplish Goal 4. They typically use this strategy to call for continuous study of the niche and make suggestions on how their research findings, topic, and/or area could be further investigated. The example below illustrates how they used this strategy to assert the importance for future research:



Examples

- In any cases, **more elaborate study should be conducted as soon as possible** to ascertain the source and mechanism of NO₃-N contamination of the groundwater in these areas⁷.

Here is a list of sentence starters achieving this strategy from the [Academic Phrasebank](#):

- Future investigations are needed to confirm whether ...
- A further study with more focus on X is therefore suggested ...
- Despite these promising results, questions remain ...
- Additional research is needed to better understand the ...
- This is an important issue for future research ...

Review

Now, let's practice applying our knowledge of the fourth goal of the results section.

7. TOMIIE, K., IWASA, Y., MAEDA, K., OTSUZUKI, M., YUNOUE, T., KAKIMOTO, R., & KAWAGOSHI, Y. (2009). Present status and feature of groundwater contamination by nitrate-nitrogen in Kumamoto City. *Journal of Water and Environment Technology*, 7(1), 19-28.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=224#h5p-29>

Excerpt A is from the Journal of Organic Chemistry⁸, and Excerpt B is from the Applied Microbiology journal⁹.

8. Richard Y. C. Shin, Prashant Sonar, Pei Sann Siew, Zhi-Kuan Chen, & Alan Sellinger. (2009). Electron-Accepting Conjugated Materials Based on 2-Vinyl-4,5-dicyanoimidazoles for Application in Organic Electronics. *The Journal of Organic Chemistry*, 74 (9), 3293-3298.

9. Qu, X., Wanner, L., & Christ, B. (2011). Multiplex real-time PCR (TaqMan) assay for the simultaneous detection and discrimination of potato powdery and common scab diseases and pathogens. *Journal of Applied Microbiology* 110(3), 769-777.

SUMMARY

We have now reviewed the four communicative goals and a variety of strategies in the Results section. It is important to remember that these four goals may not all be employed if the section is a stand-alone and separate from the Discussion. Writers may employ the first two in the Results section and the last two in the Discussion section. However, they are all equally important and required in empirical research articles — the only question is where your reader will expect them. The image below provides a snapshot of the goals we discussed in this chapter:

Results

Approaching the Niche

- Providing general information
- Restating study specifics
- Justifying study specifics

Occupying the niche

- Reporting specific results
- Indicating alternative presentation of results

Construing the niche

- Comparing the results with literature review
- Accounting for results
- Explicating results
- Relating to expectations
- Acknowledging limitations

Expanding the niche

- Generalizing results
- Stating the value
- Noting implications

- Proposing directions



Key Takeaways

There are 4 goals for Results sections:

1. **Approaching the niche:** Show a progression from all the other preceding parts (i.e., Introduction and Methods) to the Results, or findings.
2. **Occupying the niche:** Introduce new information about the niche (the specialty area or territory that you established in the Introduction and that you are now returning to in the Results section).
3. **Construing the niche:** Comment on and frame the results of the current study. This commentary helps to explain the findings and develop a reader's understanding of how the findings relate to the other literature in the discipline.
4. **Expanding the niche:** Further develop the evaluations of the results that come from Goal 3. This expanded commentary helps to relate your current study to the broader context of the discipline.

Remember to explore published research article within your field! Rhetorical choices are often discipline- and journal-dependent, making it important to notice the similarities and differences in the way they are achieved. Here are a few important points:

- all these four goals are required in empirical research articles;
- the first two goals are always achieved in the results; the last two can be in a later section;
- some strategies may not appear at all, as they are simply options for accomplishing a goal;
- some sentences may accomplish more than one strategy of a goal;
- there is no set order or frequency of the goals and strategies.

Let's try one final exercise to practice applying your knowledge of Introductions.



Review

- In what order do the goals/strategies appear in the section?
- What sentence starters appear to be common in accomplishing them?
- Is there any goal/strategy that appears to be highly frequent?

Additional resources

Consult the following free, online resources for additional tips on reporting results in a clear and concise manner:

- [Tips on Writing Results for a Scientific Paper](#)
- [Ten Simple Rules for Better Figures](#)

DRAFTING YOUR RESULTS

Draft Your Results Section



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=621#h5p-44>

We'll now move on to the next section of empirical research articles: The Discussion/Conclusion.

CHAPTER 5: WRITING THE DISCUSSION/CONCLUSION



Learning Objectives

After completing this chapter, you should be able to:

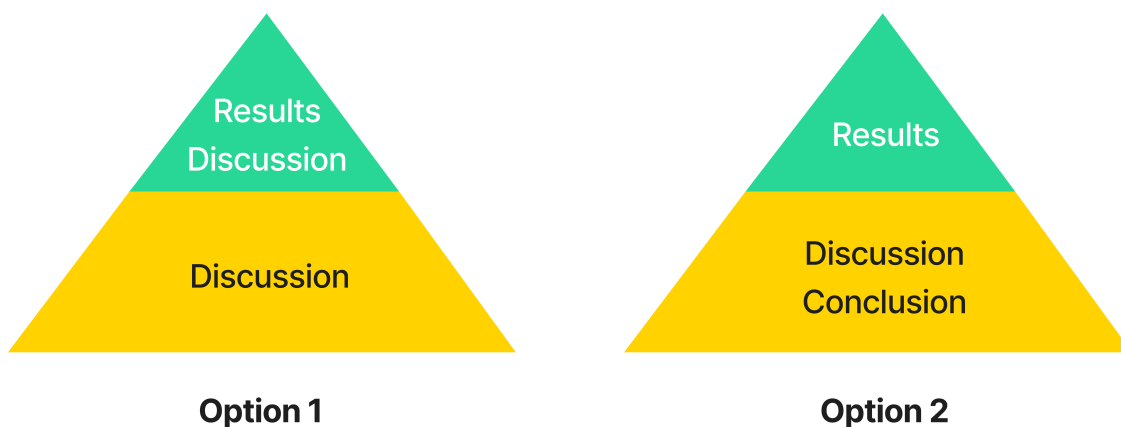
- Articulate the distinction between the Results and Discussion sections.
- Recognize the communicative goals of the Discussion/Conclusion sections.
- Strategize to achieve communicative goals.
- Optimize the language for writing your Discussion/Conclusion.
- Understand how to conclude your argument efficiently and effectively.

GOALS OF THE DISCUSSION/ CONCLUSION SECTION

The last section of a standard empirical research article is the **Discussion/Conclusion**. The main point of this chapter is to help you recognize and practice the four communicative goals of the Discussion/Conclusion section:

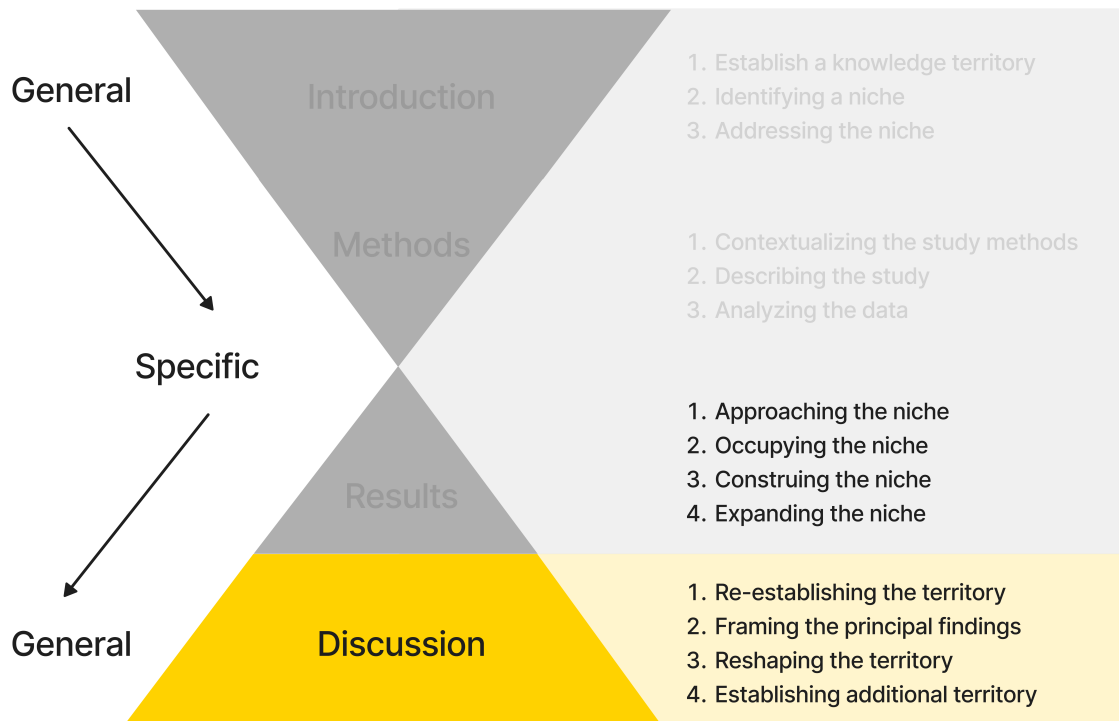
1. **Re-establishing the territory**
2. **Framing the principal findings**
3. **Reshaping the territory**
4. **Establishing additional territory**

You might find the names of these goals familiar. This is because they echo the names of the communicative goals in the Results section. As noted in previous chapters, there is variation in how empirical research articles are organized. Depending on the discipline and the journal, research writers may combine the Discussion with the Results (i.e., titling the section “Results and Discussion,” Option 1 in the depiction below) or with the Conclusion (i.e., labeling the section “Discussion and Conclusion,” Option 2 in the depiction below). Sometimes, it is clear which organizational pattern the discipline or the journal tends toward. However, there are times when the decision is based on the research itself, the topic, the methodology, or even the writer’s preference. In this e-book, we combine the Discussion with the Conclusion due to similarities in their scope, moving from specific to general in the hourglass representation.



According to the [Academic Phrasebank website](#), Discussions/Conclusions usually carry the following

functions: (a) to review and compile ideas and arguments, which may include a kind of retrospective review of the main areas covered in the writing, and (b) to evaluate the research overall, which could also involve recommending improvement to the study and considering coming trends in the research area as fellow scholars in the discipline look ahead to future investigations:



We'll now review each of these four goals and their accompanying strategies in more depth.



Warm-Up

- What types of information does the reader expect to see in the Discussion/Conclusion section?
- Which pieces of information could contribute to achieving each communicative goal?

DISCUSSION/CONCLUSION GOAL 1: RE-ESTABLISHING THE TERRITORY

The first goal in the Discussion and Conclusion section is called **Re-establishing the Territory**. The name of this goal should sound familiar to you if you think back to [Chapter 2](#) and our discussion of the goals for the Introduction section, where the first aim is to Establish the Knowledge Territory. Now that you have come to the final section of your manuscript, you will revisit this idea of “territory,” as the functions of these two sections’ goals are similar. The Discussion/Conclusion Goal 1 (Re-establish the Territory) functions to remind the reader how your research fits into the bigger picture, or territory, of the field. Effective writers use the following **strategies** to provide a foundation for the Discussion and better contextualize the study results.

Discussion

Re-establish the territory

- Drawing on general background
- Drawing on study-specific background
- Announcing principal findings
- Previewing content

Frame the principal findings

Reshape the territory

Establish additional territory

Next, we’ll explore each of these strategies in greater depth and examine some examples from published articles in high-impact journals.

Drawing on General Background

Drawing on general background means that a writer prepares the reader for the upcoming discussion of the research results in broader/more general terms. To do this, you must incorporate your understanding of

the theories and frameworks that underlie your study. You can accomplish the strategy with information from your own background knowledge, citations, or a combination of both tactics to provide needed informational background and a conceptual frame of reference for the reader. Collectively, this strategy helps remind the reader of the problem, issue, gap, etc. that motivated the study, and shows how the current study fits in the targeted knowledge/research space. Below are two examples of how you can accomplish this strategy:

Note

Remember: This is the part of the article where the writing becomes general again, signifying a shift from the narrow/detailed nature of the middle two sections (Methods and Results), and a return to a more expansive picture of how the study fits into the literature.



Examples

- It is not inconceivable, then, that whilst the sector perhaps rightly distinguishes a wide variety of professional tasks, the homogeneous nature of its personnel places too heavy a burden on all their shoulders – and hence on the sole training program for the job. **The fact is that in countries like the United Kingdom (see Peeters, 2008) and the United States (Hyson & Biggar, 2006),** which have long had a variety of training schemes leading to a variety of qualifications – associate, foundation, Bachelor’s, and Master’s degrees, at both initial licensure and advanced level – **there is clearly greater differentiation in the nature and level of content standards (see also Busch-Rossnagel & Worman, 1985)**¹
- A relationship between carbohydrates and rooting of cuttings has been reported (Bartolini et al. 1996, 2000; Murai et al. 1999), but high carbohydrate content has not always been associated with high rooting and sprouting potential, as this study showed. **Hansen et al. (1978) and Veierskov et al. (1982) observed a negative correlation**

1. Fukkink, R. G. (2010). Missing pages? A study of textbooks for Dutch early childhood teacher education. *Teaching and Teacher Education*, 26(3), 371-376.

between carbohydrates and rooting (when light was given to alter stock plant carbohydrate content).²

If you are referring back to literature (whether it is in the literature review in your Introduction, or not), you can use specific wording (sentence starters) to indicate to your reader that you are re-establishing the territory. Here are some suggestions from the [Academic Phrasebank website](#):

- Several reports have shown that ...
- As mentioned in the literature review, ...
- Prior studies that have noted the importance of ...
- Very little was found in the literature on the question of ...
- Previous studies evaluating X observed inconsistent results on whether ...
- A strong relationship between X and Y has been reported in the literature.
- In reviewing the literature, no data was found on the association between X and Y.

If your goal is to note a similarity or contrast to previous findings, Academic Phrasebank provides separate lists for each of those communicative purposes:

	Support Previous Findings	Contradict Previous Findings
These results ...	• further support the idea of ... • confirm the association between ... • are consistent with data obtained in ... • match those observed in earlier studies. • are in line with those of previous studies. • are in agreement with those obtained by ... • are in accord with recent studies indicating that ... • seem to be consistent with other research which found ... • support previous research into this brain area which links X and Y. • corroborate the ideas of Smith and Jones (2008), who suggested that ...	• are contrary to those of Smith et al. (2001) who found ... • are in opposition to previous studies which have suggested that ... • are higher/lower compared to those of other studies. • do not support the previous research. • differ from the findings elsewhere. • are far below those observed by Smith <i>et al.</i> (2007). • differ from X (2003), but they are broadly consistent with ... • are inconsistent with other research. • seem inconsistent with other studies. • call into question the results of others.

2. Tsipouridis, G., Thomidis, T., & Bladenopoulou, S. (2006). Seasonal variation in sprouting of GF677 peach × almond (*Prunus persica* × *Prunus aygdalus*) hybrid root cuttings. *New Zealand Journal of Crop and Horticultural Science*, 34(1), 45-50.

Another way to accomplish this strategy is to contribute background information by referencing the research question or aim/objective, as exemplified in these sentence starters from the [Academic Phrasebank website](#):

- The third question in this research was ...
- An initial objective of the project was to identify ...
- The first question in this study sought to determine ...
- It was hypothesized that participants with a history of ...
- The present study was designed to determine the effect of ...
- With respect to the first research question, it was found that ...
- This study set out with the aim of assessing the importance of X in ...

Drawing on Study-Specific Background

Drawing on study-specific background is similar to the previous strategy in that it attempts to justify and further reflect on the results. This strategy reiterates relevant study specifics (e.g., methods, approaches, experimentation, procedures, analysis, hypotheses/research questions, etc.) to help the reader understand how the results were obtained, remind the reader of study specifics relevant to the results and/or claims discussed further, clarify the connection between certain study specifics and respective results, and/or re-emphasize the reliability of discussed findings. Consider the **bolded** language in the following examples:



Examples

- **This analysis considered the efficacy of a suite of** even- and uneven-aged treatments **to address** fire hazard in Colorado based on their ability to reduce crown fire initiation and spread. The treatment **simulations were performed** over a broad area **using** available forest inventory **data** and consistent assumptions about surface fuels and weather conditions.³
- **Since we consider sinusoidal bottom contours we describe the** hydraulic jumps in terms of the Froude number at the inclination angle of the channel.⁴

3. Huggett Jr, R. J., Abt, K. L., & Shepperd, W. (2008). Efficacy of mechanical fuel treatments for reducing wildfire hazard. *Forest Policy and Economics*, 10(6), 408-414.

Announcing Principal Findings

Announcing principal findings is a way to highlight results by explaining, synthesizing, and/or reviewing what you discovered. The purpose is to emphasize takeaways, show how you've accomplished the objectives of the research, and/or demonstrate which specific discoveries occupy the identified niche in the sub-area of your discipline or field.



Examples

- The processes involved in aerial pathogen movement can be divided into five stages of (i) preconditioning in a source area, (ii) release, (iii) horizontal transport, (iv) deposition, and (v) impact at the receptor area (Isard and Gage, 2001). Ecological and environmental factors that influence organisms during each stage of the dispersal process **are important for understanding the movement of plant pathogens and the development of plant disease epidemics** (Aylor, 1986; Madden, 1992). However, there is limited information about some of these processes, especially for the deposition of plant pathogen propagules from the atmosphere onto susceptible host plant tissues.⁵
- **A major finding of this study is that** short and long-term androstenedione supplementation did not increase the serum testosterone concentration in young men with normal serum testosterone levels.⁶

The [Academic Phrasebank website](#) provides these suggestions for starting out sentences in which you plan to discuss or draw conclusions about your findings:

- The current study found that ...

4. Wierschem, A., & Aksel, N. (2004). Hydraulic jumps and standing waves in gravity-driven flows of viscous liquids in wavy open channels. *Physics of Fluids*, 16(11), 3868-3877.

5. Dufault, N., Isard, S., "A portable rainfall simulator for evaluating the wet deposition of plant pathogens", *Applied Engineering in Agriculture*, 26(1):71-78, 2010

6. King, D. S., Sharp, R. L., Vukovich, M. D., Brown, G. A., Reifenrath, T. A., Uhl, N. L., & Parsons, K. A. (1999). Effect of oral androstenedione on serum testosterone and adaptations to resistance training in young men: a randomized controlled trial. *Jama*, 281(21), 2020-2028.

- Another important finding was that ...
- In this study, Xs were found to cause ...
- On the question of X, this study found that ...
- This experiment did not detect any evidence for ...
- The most important clinically relevant finding was ...
- X provided the largest set of significant clusters of ...
- It is interesting to note that in all seven cases of this study ...
- The most obvious finding to emerge from the analysis is that ...
- In the current study, comparing X with Y showed that the mean degree of ...
- The results of this study did not show that .../did not show any significant increase in ...

Previewing Content

Previewing content designates the organization of your discussion. This helps to guide the reader through your ideas, clarify how you envision the content fulfilling your communicative goals, and point out noteworthy features of the research. The following are examples of how you can realize this strategy:



Examples

- **Next, we provide evidence that** AAP2 functions in xylem-phloem transfer of amino acids.⁷
- Results underscore the promise of the WG vocabulary intervention for LM learners. **There are multiple implications and discussion points – practical and theoretical – to address when interpreting the results of this pilot study.** WG was implemented for only 15-20 min a day, and yet the treatment group students, more of whom were formerly identified as limited English proficient, gained knowledge of a substantially larger number of words than the contrast group.⁸

7. Zhang, L., Tan, Q., Lee, R., Trethewy, A., Lee, Y. H., & Tegeder, M. (2010). Altered xylem-phloem transfer of amino acids affects metabolism and leads to increased seed yield and oil content in Arabidopsis. *The Plant Cell*, 22(11), 3603-3620.

8. Mancilla-Martinez, Jeannette. (2010). Word meanings matter: Cultivating English vocabulary knowledge in fifth-grade Spanish-speaking language minority learners. *TESOL Quarterly*, 44(4), 669-699.

Review

Now, let's practice applying our knowledge of the first goal of the Discussion/Conclusion section.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=239#h5p-34>

Excerpt A is from the Journal of MIS Quarterly⁹ and Excerpt B is from the Journal of Language Learning and Technology¹⁰.

9. Pavlou, P.A., Liang, H. & Xue, Y. (2007). Understanding and mitigating uncertainty in online exchange relationships: A principal-agent perspective. *MIS quarterly*, 105-136.

10. Stockwell, G. (2010). Using mobile phones for vocabulary activities: Examining the effect of the platform. *Language Learning & Technology*, 14(2), 95-110.

DISCUSSION/CONCLUSION GOAL 2: FRAMING PRINCIPAL FINDINGS

The next goal in the Discussion and Conclusion section is **Framing Principal Findings**. The function of this goal is to discuss and establish the meaning of your research results. The name Framing Principal Findings comes from the aim of positioning the outcomes of your study in a way that the reader can understand, typically, within the already existing literature on the topic. There are four **strategies** that can be used to achieve the communicative aims of Goal 2. Note that these are primarily associated with discussion of results rather than drawing conclusions about the entirety of the research.

Discussion

Re-establishing the territory

Frame the principal findings

- Accounting for principal results
- Explicating results
- Relating to expectations
- Addressing limitations

Reshape the territory

Establish additional territory

Now we'll delve deeper into each of the strategies you can use to achieve this goal in your own writing.

Accounting for Results

Accounting for results

is a way for you to reflect on or further consider the findings of your study. This could be accomplished with or without referencing previous works. You can use this strategy to clarify what may have contributed to,

caused, or otherwise affected the results or outcomes. You may also want to suggest reasons or hypotheses that could account for certain findings, and justify the nature of results. Here are two examples of how you can accomplish this strategy, with strategy-specific language in **bold**:



Examples

- These changes **are most probably related to** modifications in N uptake into aap2 mesophyll cells, as suggested by upregulation of amino acid importer LHT1 (Figure 7A) and increased uptake of ¹⁴C-label.¹
- That multiple genes in this pathway are underexpressed in hybrids of both species pairs **perhaps is a cause or consequence of** their sterility.²

The [Academic Phrasebank](#) offers a wealth of sentence starters useful to writers in this stage of reporting their research:

General comments and explanations:

- A possible explanation for this might be that ...
- Another possible explanation for this is that ...
- This result may be explained by the fact that ...
- There are, however, other possible explanations.
- These relationships may partly be explained by ...
- There are several possible explanations for this result.
- These results are likely to be related to ...
- It seems possible that these results are due to ...

Reporting inconsistent, counterintuitive, or contradictory findings:

- These differences can be explained in part by ...
- This inconsistency may be due to ...
- This discrepancy could be attributed to ...

1. Zhang, L., Tan, Q., Lee, R., Trethewy, A., Lee, Y. H., & Tegeder, M. (2010). Altered xylem-phloem transfer of amino acids affects metabolism and leads to increased seed yield and oil content in Arabidopsis. *The Plant Cell*, 22(11), 3603-3620.

2. Noor, M. A. (2005). Patterns of evolution of genes disrupted in expression in Drosophila species hybrids. *Genetics Research*, 85(2), 119-125.

- This rather contradictory result may be due to ...
- The observed increase in X could be attributed to ...
- It is difficult to explain this result, but it might be related to ...
- The possible interference of X cannot be ruled out.
- Differences between X and Y may have influenced ...
- These possible sources of error could have affected ...
- There are two likely causes for the differences between ...
- The reason for this is not clear but it may have something to do with ...
- Since this difference has not been found elsewhere it is probably not due to ...

Explicating Results

The **explicating results** strategy interprets the reported results in the context of the study and/or in a broader context of the discipline. Here is where you consider your results and their implications. Your readers, of course, will develop their own interpretations or explanations for *why* the findings turned out as they did; however, you will want to guide their views as you make an argument explaining your own reasoning.

Here are a couple of examples from published articles in high-impact journals:



Examples

- **We must therefore conclude**, to use the terminology of Goodlad et al. (1979), **that** the content standards, as formulated by the relevant official bodies, have not been properly incorporated into the formal curriculum, despite their authoritative national status.³
- **This research also showed that** the effectiveness of rotations at reducing the weed seedbank was dependent on the specific crop that initiated the rotations (Fig. 1-3).⁴

3. Fukkink, R. G. (2010). Missing pages? A study of textbooks for Dutch early childhood teacher education. *Teaching and Teacher Education*, 26(3), 371-376.

4. Teasdale, J. R., Mangum, R. W., Radhakrishnan, J., & Cavigelli, M. A. (2004). Weed seedbank dynamics in three organic farming crop rotations. *Agronomy Journal*, 96(5), 1429-1435.

Relating to Expectations

Relating to expectations reasons about the researchers' anticipated or unanticipated findings and/or observations. You can use this strategy to point out expected or unexpected results, express your attitudes about the results, often concerning surprise or unsatisfactory findings, and connect findings to initial hypotheses (i.e., to describe how findings were or were not confirmed, as seen in the following examples):



Examples

- **Hypothesis 1 is verified by** unchanged oil content values in rain-fed plot.⁵
- **Interestingly, relative to** inulin the dimer **exhibited higher activity than** the tetramer [35].⁶

The [Academic Phrasebank](#) recommends these phrases that are in line with using this strategy:

- Surprisingly, X was found to ...
 - What is surprising is that ...
 - One unanticipated finding was that ...
 - Surprisingly, no differences were found in ...
 - This finding was unexpected and suggests that ...
 - It is somewhat surprising that no X was noted in this condition ...
 - Contrary to expectations, this study did not find a significant difference between ...
 - However, the observed difference between X and Y in this study was not significant.
 - However, the ANOVA (one way) showed that these results were not statistically significant.
-

5. Bedbabis, S., Rouina, B. B., & Boukhris, M. (2010). The effect of waste water irrigation on the extra virgin olive oil quality from the Tunisian cultivar Chemlali. *Scientia Horticulturae*, 125(4), 556-561..

6. Artyukhov, V. G., Kovaleva, T. A., Kholyavka, M. G., Bityutskaya, L. A., Grechkina, M. V., & Obraztsova, T. B. (2009). Study of the oligomeric structure and some physicochemical properties of inulinase from *Kluyveromyces marxianus* Y-303. *Biophysics*, 54(6), 675-680.

Addressing Limitations

Addressing limitations is used to evaluate the study by pointing out shortcomings and/or minimizing deficiencies in the research. The following are examples of how you can realize this strategy, with specific language for expressing these limitations in **bold**.



Examples

- **However, the study area spans an overly large region** encompassing several climatic zones, **which calls into question whether** chronologies can simply be averaged.⁷
- **Our study was not free of problems, however.** For instance, the overall rate of participation in sending feedback by e-mail was just over 50% of all participants (23 corrective feedback e-mails to 44 transcripts in English sessions and 23 corrective feedback e-mails to 43 transcripts in Japanese sessions).⁸

It's important to note that research reports do not provide information without taking a stance toward that information. Researchers may indicate more or less certainty about their interpretations, and this is especially true of Addressing Limitations. While it's important, of course, to point to the shortcomings of your study (as no study is perfect), it's also critical not to over-emphasize the deficiencies in your research. So, you may want to highlight a contribution that your study makes while simultaneously acknowledging some aspect that was less than ideal. In that case, you would want to hedge or boost accordingly, as showing in these sentence starters from the [Academic Phrasebank](#).

7. Black, B. A., Copenheaver, C. A., Frank, D. C., Stuckey, M. J., & Kormanyos, R. E. (2009). Multi-proxy reconstructions of northeastern Pacific sea surface temperature data from trees and Pacific geoduck. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 278(1-4), 40-47.

8. Bower, J., & Kawaguchi, S. (2011). Negotiation of meaning and corrective feedback in Japanese/English eTandem. *Language Learning & Technology*, 15(1), 41-71.

Hedging

- These findings **may** be **somewhat** limited by ...
- These findings **cannot** be extrapolated to all patients.
- These data **must** be interpreted with caution because ...
- These results, therefore, **need to be** interpreted with caution.
- In observational studies, there is a **potential** for bias from ...
- These results **should** be interpreted with caution.

Boosting

- In spite of its limitations, the study **certainly** adds to our understanding of the ...
- Notwithstanding the relatively limited sample, this work offers **valuable** insights into ...
- Obviously, caution must be advised, but we want to **emphasize** ...
- Regardless of the imperfect design, there are **definite** benefits to the study's methodology, and those benefits contribute to the value of the results by ...

Sometimes it isn't necessary to hedge or boost, but rather to simply present the information as neutrally as possible.

- It could be argued that the positive results were due to ...
- Although the current study is based on a small sample of participants, the findings suggest ...
- While this study did not confirm X, it did ...
- Notwithstanding these limitations, the study suggests that ...
- Despite its exploratory nature, this study offers some insight into ...
- A note of caution is due here since ...
- Another source of uncertainty is ...
- These results, therefore, need to be interpreted with caution.
- In observational studies, there is a potential for bias from ...
- It is important to bear in mind the possible bias in these responses.

Review

Now, let's practice applying our knowledge of the second goal of the discussion/conclusion section.



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Excerpt A is from the Journal of MIS Quarterly⁹ and Excerpt B is from the Journal of Crop Science¹⁰.

9. Susan, M.M. & David, S. (2010). What makes a helpful online review? A study of customer reviews on amazon. com. *MIS Quarterly*, 34(1), 185-200.

10. Möhring, J., Melchinger, A., & Piepho, H. (2011). REML-based diallel analysis. *Crop Science*, 51(2), 470-478.

DISCUSSION/CONCLUSION GOAL 3: RESHAPING THE TERRITORY

The next goal in the Discussion and Conclusion sections is **Reshaping the Territory**. The primary function of Goal 3 is to redefine the research area based on what your study contributes to the literature. This goal's name reflects the dual role of generating new knowledge and connecting it to prior knowledge from previous studies about the research territory. In this way, Goal 3 gives an update on the topic within your field.

Discussion

Re-establishing the territory

Frame the principal findings

Reshape the territory

- Supporting with evidence
- Countering with evidence

Establish additional territory

Next, we'll explore these two **strategies** and examine some examples from published empirical research articles.

Supporting with Evidence

Supporting with evidence explains how the research findings reiterate findings from other studies. You can use this strategy to highlight the complementary or supplementary contribution your results make. This strategy confirms or supports the assertions made by other researchers and/or your assertions based on the findings. Here are two examples of how you can accomplish this strategy:



Examples

- This difference in outcome between the treatment groups did not reach statistical significance, but an overall survival rate of 80% **was very similar to that reported in the recent literature** [13].¹
- **This supports previous findings that** early and late growth in mice occur under different genetic regulation (Cheverud et al., 1996; Vaughn et al., 1999; Rocha et al., 2004).²

The [Academic Phrasebank](#) recommends these phrases that are in line with using this strategy, including statements about one particular finding:

- This finding was also reported by Smith et al. (1989).
- This finding is consistent with that of Smith (2000) who ...
- Comparison of this result with those of other studies confirms ...
- This also accords with our earlier observations, which showed that ...
- This finding broadly supports the work of other studies in this area linking X with Y.
- It is encouraging to compare this figure with that found by Jones (1993) who found that ...
- There are similarities between the attitudes expressed by X in this study and those described by ...

Below are statements from Academic Phrasebank about the results as a whole. *These results:*

- further support the idea of ...
- confirm the association between ...
- are consistent with data obtained in ...
- match those observed in earlier studies.
- are in line with those of previous studies.
- are in agreement with those obtained by ...
- are in accord with recent studies indicating that ...

1. Atherton, R. P., Furr, M. O., McKenzie, H. C., & Desrochers, A. M. (2011). Efficacy of Hyperimmunized Plasma in the Treatment of Horses with Acute Colitis. *Journal of Equine Veterinary Science*, 31(1), 19-25.

2. Ishikawa, A., Hatada, S., Nagamine, Y., & Namikawa, T. (2005). Further mapping of quantitative trait loci for postnatal growth in an intersubspecific backcross of wild *Mus musculus castaneus* and C57BL/6J mice. *Genetics Research*, 85(2), 127-137.

- seem to be consistent with other research which found ...
- are consistent with those of Smith and Jones (2015) who ...
- are in agreement with Smith's (1999) findings which showed ...
- support previous research into this brain area which links X and Y.
- corroborate the ideas of Smith and Jones (2008), who suggested that ...

Countering with Evidence

Countering with evidence is used when some or all of your results are contrary to those in previous research studies. The following are examples of how you can realize this strategy in your own writing:



Examples

- Bontozoglou found a nonlinear resonance at a waviness smaller than ours [26]. **However, the one he found** numerically for the capillary-gravity regime in rather thick films **is quite different from our observations**.³
- The molecular mass of deglycosylated inulinase from *Aspergillus awamori* var. 2250 constitutes 69 kDa [18]; from *Aspergillus niger* 12, 81 kDa [38]; from *aspergillus candida*, 54 kDa [39]; from *Aspergillus ficuum*, 74 kDa [40]; from *Aspergillus fumigatus*, 62 kDa [41], **which differ strongly from the results obtained for** exoinulinase from *Aspergillus versicolor*, 230 ± 20 kDa [42].⁴

The [Academic Phrasebank](#) proposes the following sentence starters as ways for advising cautious interpretation of the findings:

- This study has been unable to demonstrate that ...
- However, this result has not previously been described.

3. Wierschem, A., & Aksel, N. (2004). Hydraulic jumps and standing waves in gravity-driven flows of viscous liquids in wavy open channels. *Physics of Fluids*, 16(11), 3868-3877.

4. Artyukhov, V. G., Kovaleva, T. A., Kholyavka, M. G., Bityutskaya, L. A., Grechkina, M. V., & Obratsova, T. B. (2009). Study of the oligomeric structure and some physicochemical properties of inulinase from *Kluyveromyces marxianus* Y-303. *Biophysics*, 54(6), 675-680.

- This outcome is contrary to that of Smith et al. (2001) who found ...
 - This finding is contrary to previous studies which have suggested that ...
 - In contrast to earlier findings, however, no evidence of X was detected.
 - The yields in this investigation were higher compared to those of other studies.
 - However, the findings of the current study do not support the previous research.
 - Smith et al. (1999) showed that ... This differs from the findings presented here ...
 - The overall level was found to be 15%, lower than that of previously reported levels.
 - It has been suggested that ... (Smith et al., 2002). This does not appear to be the case.
 - The levels observed in this investigation are far below those observed by Smith et al. (2007).
 - These results differ from X's 2003 estimate of Y, but they are broadly consistent with earlier ...
-

Review

Now, let's practice applying our knowledge of the third goal of the discussion/conclusion section.



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<https://iastate.pressbooks.pub/isudp-2026-252/?p=245#h5p-36>

Excerpt A is from the Journal of Language Learning & Technology⁵ and Excerpt B is from the Journal of MIS Quarterly⁶.

5. Sydorenko, T., (2010). Modality of input and vocabulary acquisition. *Language Learning & Technology*, 14(2), 50-73.

6. Susan, M.M. & David, S. (2010). What makes a helpful online review? A study of customer reviews on amazon.com. *MIS Quarterly*, 34(1), 185-200.

DISCUSSION/CONCLUSION GOAL 4: ESTABLISHING ADDITIONAL TERRITORY

The fourth goal in the Discussion and Conclusion section is called **Establishing Additional Territory**. Goal 4 is accomplished when the writer expands the conversation beyond the results of their research and presents the bigger picture of how the findings fit into the discipline at large. Goal 4 is entitled Establishing Additional Territory, because enlarging the focus demonstrates the expansion of the research space for the issue and the discipline. It is within this additional space that future research is able to extend the knowledge generated in your study.

Discussion

Re-establish the territory

Frame the principal findings

Reshape the territory

Establish additional territory

- Generalizing results
- Stating the value
- Noting implications
- Proposing directions

We'll now discuss each of these **strategies** and provide some examples from published empirical research articles.

Generalizing Results

Writers are **generalizing results** when they draw inferences to bolster their overall arguments and conclusions. To use this strategy, you may wish to summarize or synthesize your findings. Remember that

one main purpose of the research report is to demonstrate how your work fits into the existing body of literature in the field. So, this strategy is a way for you to enhance the value of your findings by generalizing and pointing out how the results transfer and compare and/or contrast to previous conclusions. This is also a chance for you to highlight the reliability and/or validity of your study, thus allowing your findings to be more generalizable. Here are two examples of how you can accomplish this strategy:



Examples

- **The results of this study thereby show that** the choice of the best model depends on the error measurement which depends on the ultimate purpose of the forecasting procedure.¹
- **To summarize, the results from this study suggest that** high calpastatin activity results in decreased calpain activity **and, thus,** decreased tenderness.²

Stating the Value

Stating the value shows the centrality of the study within the field by characterizing the most salient results. Essentially, this strategy enables you to advocate for the significance of your work within your discipline. It's a chance for you to label your exact contribution. Consider the language in **bold** in the following examples:



Examples

- **Therefore, the findings on** QTLs contributing to naturally occurring variations in postnatal growth **are expected to be novel.**³

1. Corredor, P., & Santamaría, R. (2004). Forecasting volatility in the Spanish option market. *Applied Financial Economics*, 14(1), 1-11.

2. Boehm, M. L., Kendall, T. L., Thompson, V. F., & Goll, D. E. (1998). Changes in the calpains and calpastatin during postmortem storage of bovine muscle. *Journal of Animal Science*, 76(9), 2415-2434.

3. Ishikawa, A., Hatada, S., Nagamine, Y., & Namikawa, T. (2005). Further mapping of quantitative trait loci for postnatal growth in an intersubspecific backcross of wild *Mus musculus castaneus* and C57BL/6J mice. *Genetics Research*, 85(2), 127-137.

- **The finding that** TAF7 functions independently of a TAF1/TFIID complex **significantly extends the growing body of evidence that** TAFs contribute to transcriptional regulation outside of their assembly in the intact TFIID complex.⁴

Noting Implications

Noting implications is a strategy that allows you to highlight the potential implications of the results and/or the study as a whole. You can use this strategy to explain how the findings could be applied to future research, practice, the development of theory in the discipline. Also, this shows the larger impact of the results and/or study in the discipline, and notifies the reader of possible consequences of the study and/or results (note the examples below).



Examples

- Notably, even callers claiming to have a privately insured child faced an average wait time of 20 days when urgently requesting an appointment. **These findings signal a need to consider** refining specialty care delivery processes to more efficiently use the specialist workforce [28,29]. Two previous audit studies of pediatric specialty care have shown even lower Medicaid acceptance rates: 4% [13] and 8% [7].⁵
- Soldiers exposed to combat were more likely than non-combat veterans to be disabled and unemployed in their mid-20s and to remain so throughout their work life. **Policymakers and citizens should note these long-term consequences of** war as U.S. soldiers continue to fight in Iraq and Afghanistan. As these wars continue, future combat veterans who sustain mental and physical injuries in battle will likely suffer, as did past combat veterans, in their socioeconomic attainment.⁶

4. Devaiah, B. N., Lu, H., Gegonne, A., Sercan, Z., Zhang, H., Clifford, R. J., ... & Singer, D. S. (2010). Novel functions for TAF7, a regulator of TAF1-independent transcription. *Journal of Biological Chemistry*, 285(50), 38772-38780.

5. Bednarek, P., Creinin, M., Reeves, M., Cwiak, C., Espey, E., Jensen, J. (2011). "Immediate versus delayed IUD insertion after uterine aspiration", *New England Journal of Medicine* 364(23):2208-2217.

Proposing Directions

Proposing directions is a way to make recommendations or suggestions about the next step of either your research or further research within the same area. This is also a means of proposing practical applications of the results. You can employ this strategy to make an argument for the need for future research or the opportunity to expand the niche by contributing new information/knowledge. The following are examples of how you can realize this step:



Examples

- **It would be interesting to design breeding experiments to explore** if high AGPase activity late in grain filling stage cosegregates with enhanced seed weight in population segregating for grain weight so that cause/effect relationship could be established.⁷
- **Further research is recommended to confirm the efficacy of** the product, to ascertain an optimal dosage for the hyperimmune plasma used in this study, and to clarify whether enteral or parenteral administration is more beneficial to the patient.⁸

The [Academic Phrasebank](#) has a large number of sentence starters that serve to recommend further work. These are divided into two categories.

Recommendations for future research:

- The study should be repeated using ...
- This would be a fruitful area for further work.
- Several questions still remain to be answered.
- A natural progression of this work is to analyze...
- More research using controlled trials is needed to ...

6. MacLean, A. (2010). The things they carry: Combat, disability, and unemployment among US men. *American sociological review*, 75(4), 563-585.

7. Devi, T. A., Sarla, N., Siddiq, E. A., & Sirdeshmukh, R. (2010). Activity and expression of adenosine diphosphate glucose pyrophosphorylase in developing rice grains: Varietal differences and implications on grain filling. *Plant science*, 178(2), 123-129.

8. Atherton, R. P., Furr, M. O., McKenzie, H. C., & Desrochers, A. M. (2011). Efficacy of Hyperimmunized Plasma in the Treatment of Horses with Acute Colitis. *Journal of Equine Veterinary Science*, 31(1), 19-25.

- More broadly, research is also needed to determine ...
- A further study could assess the long-term effects of ...
- What is now needed is a cross-national study involving ...
- Considerably more work will need to be done to determine ...
- The precise mechanism of X in insects remains to be elucidated.
- These findings provide the following insights for future research: ...
- Large randomized controlled trials could provide more definitive evidence.
- This research has thrown up many questions in need of further investigation.
- A greater focus on X could produce interesting findings that account more for ...
- The issue of X is an intriguing one that could be usefully explored in further research.

Recommendations for practice or policy:

- There is, therefore, a definite need for ...
- Greater efforts are needed to ensure ...
- Another important practical implication is that ...
- Moreover, more X should be made available to ...
- Unless governments adopt X, Y will not be attained.
- These findings suggest several courses of action for ...
- A reasonable approach to tackle this issue could be to ...
- Continued efforts are needed to make X more accessible to ...
- The findings of this study have a number of practical implications.
- There are a number of important changes which need to be made.
- Management to enhance bumble-bee populations might involve ...
- This study suggests that X should be avoided by people who are prone to ...
- A key policy priority should therefore be to plan for the long-term care of ...
- This information can be used to develop targeted interventions aimed at ...
- Taken together, these findings do not support strong recommendations to ...
- Ensuring appropriate systems, services, and support for X should be a priority for ...

Review

Now, let's practice applying our knowledge of the fourth goal of the discussion/conclusion section.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=248#h5p-37>

Excerpt A is from the Journal of Language Testing⁹ and Excerpt B is from the Journal of Agricultural and Food Chemistry¹⁰.

9. Bae, J., & Bachman, L. (2010). An investigation of four writing traits and two tasks across two languages. *Language Testing*, 27(2), 213-234.

10. Anema, S., Lee, S., & Klostermeyer, H. (2011). Rennet-Induced Aggregation of Heated pH-Adjusted Skim Milk. *Journal of agricultural and food chemistry*, 59(15), 8413-8422.

SUMMARY

We have now reviewed the four communicative goals and a variety of strategies of the Discussion/Conclusion section. It is important to note that all these four goals are required to be achieved, regardless of the organization of empirical research articles (i.e., combining the Results with the Discussion or the Discussion with the Conclusion). The image below provides a snapshot of the strategies of goals we discussed in this chapter:

Discussion

Re-establish the territory

- Drawing on general background
- Drawing on study-specific background
- Announcing principal findings
- Previewing content

Frame the principal findings

- Accounting for principal results
- Explicating results
- Relating to expectations
- Addressing limitations

Reshape the territory

- Supporting with evidence
- Countering with evidence

Establish additional territory

- Generalizing results
- Stating the value
- Noting implications
- Proposing directions

Finally, but importantly, many novice researchers find the Discussion/Conclusion section to be the most challenging section to write. The key to overcoming this is to learn what communicative goals successful writers use when composing this section. Wallwork (2016, p. 311) gives two general pieces of advice: (a) be “positive about your own limitations, and constructive when discussing what you believe to be the limitations of others.”; (b) “... interpret your results without repeating them.”



Key Takeaways

There are 4 goals for Discussion sections:

1. **Re-establishing the territory:** Remind the reader how your research fits into the bigger picture, or territory, of the field.
2. **Framing the principal findings:** Discuss and establish the meaning of your research results.
3. **Reshaping the territory:** Redefine the research area based on what your study contributes to the literature.
4. **Establishing additional territory:** Expands the conversation beyond the results of their research and presents the bigger picture of how the findings fit into the literature.

Remember to explore published research article within your field! Rhetorical choices are often discipline and journal dependent, making it important to notice the similarities and differences in the way they are achieved. Here are a few important points:

- There is no linear order for organizing your content to fulfill these communicative goals.
- Some communicative strategies are used more extensively than others.
- Different strategies can be combined to achieve a stronger communicative effect.
- The use of strategies varies depending on disciplinary conventions.
- It is up to us as academic writers to evaluate our writing intentions and assess the degree to which we accomplish our goals.

Let's try one final exercise to practice applying your knowledge of Discussions and Conclusions.

Review



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=628#h5p-38>

Excerpt A is from Crop Science¹, Excerpt B is from the Calico Journal², Excerpt C is from Crop Science³, and Excerpt D is from the Agronomy Journal⁴.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=628#h5p-39>

The excerpt is from the British Journal of Sociology⁵.

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1. Möhring, J., Melchinger, A., & Piepho, H. (2011). REML-based diallel analysis. *Crop Science*, 51(2), 470-478.
 2. Reinhardt, J., & Zander, V. (2011). Social networking in an intensive English program classroom: A language socialization perspective. *Calico Journal*, 28(2), 326-344.
 3. Möhring, J., Melchinger, A., Piepho, H., "REML-based diallel analysis", *Crop Science* 51(2):470-478, 2011
 4. Fernandez, M., Ulrich, D., Brandt, S., Zentner, R., Wang, H., Thomas, A., & Olfert, O. (2011). Crop Management Effects on Root and Crown Rot of Wheat in West-Central Saskatchewan, Canada. *Agronomy Journal*, 103(3), 756-765.
 5. Andersen, R., & Van de Werfhorst, H. G. (2010). Education and occupational status in 14 countries: the role of educational institutions and labour market coordination. *The British Journal of Sociology*, 61(2), 336-355.

DRAFTING YOUR DISCUSSION

Review



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=626#h5p-45>

CHAPTER 6: WRITING THE ABSTRACT



Learning Objectives

After completing this chapter, you should be able to:

- Understand the importance of the Abstract.
- Articulate the roles Abstracts play in academic spheres.
- Recognize the communicative goals of Abstracts.
- Apply strategies to achieve each of the communicative goals.
- Utilize impactful language in writing your Abstract.
- Evaluate your Abstract.

DEFINING ABSTRACTS

What is an Abstract?

Abstract

“A short form, or synopsis, of a larger text or project, describing work that is proposed, in development, or completed”¹.

The definition above underscores the chronology of an abstract’s use – future work, current work, or finished products. These varied uses of an abstract contribute to its diverse forms because what is included in an abstract is heavily influenced by its intended function. A good abstract should be: accurate, self-contained, concise and specific, non-evaluative, and coherent and readable (American Psychological Association, 2001). Types of abstracts include:

1. Informative (summary of an article)
2. Indicative/descriptive (explains general information but usually excludes results)
3. Structured (summary that uses headings for each section of the RA)

As the first type (**informative abstract**) is the most common form of abstract², and the one most closely associated with the topic of this book (research articles), we will focus our attention on this type. Swales and Feak (2009) note two major functions of this particular kind of abstract:

- Previewing or summarizing academic work
- Proposing academic work

1. Curry, M. J., He, F., Weijia, L., Zhang, T., Zuo, Y., Altalouli, M., and Ayeshe, J. (2021). *An A to W of Academic Literacy: Key Concepts and Practices for Graduate Students*. Ann Arbor: University of Michigan Press.

2. Gladon, R. J., Graves, W. R., & Kelly, J. M. (2011). *Getting published in the life sciences*. John Wiley & Sons.

That work may be a research article, a thesis or dissertation, a conference presentation, or a chapter of a book. In order to determine what is included in your abstract, you'll need to first answer some *wh*-questions:

- **Who** is the audience for the abstract and what is their level of expertise on the topic or within the discipline?
- **Why** was the research undertaken?
- **What** are the research questions or hypotheses?
- **What** methods were used?
- **What** were the general findings/conclusions?
- **What** are the implications for the subject matter or field?
- **Where** will the abstract be published?
- **How** should the abstract be formatted?

A successful abstract answers these questions as a way of becoming a stand-alone document ³.



Warm-Up

Now that we've explored the basic definition of an abstract, consider these questions:

1. What is the goal of an Abstract?
2. What are the forms of an Abstract?

3. Gladon, R. J., Graves, W. R., & Kelly, J. M. (2011). *Getting published in the life sciences*. John Wiley & Sons.

GOALS OF AN ABSTRACT

As noted in previous sections, abstracts serve many purposes. Abstracts may be used to apply for conferences or to scaffold the presentation of theses/dissertations, but the particular type we will focus on in this book is the informative abstract, which appears at the beginning of a research article and serves to provide “a miniature version, or microcosm, of the manuscript”¹. Because publication of research article manuscripts is highly competitive, and because acceptance of the manuscript is often predicated on the reading of the abstract alone², the function of an abstract is extremely important in the life of an academic. The American Psychological Association³ notes the significance of abstracts by claiming, “A well-prepared abstract can be the most important single paragraph in an article” (p. 26).

So, what exactly are the purposes of an abstract? How do they function to meet the needs of readers? Based on reviews of several sources^{4,5,6} that specifically outline the functions of abstracts, we would like to highlight four main purposes that coincide with the goals of this textbook:

1. To serve as stand-alone miniature versions of an article, summarizing the topic, motivation, methodology, and main results;
2. To act as screening devices, aiding choices about reading an article (or not);
3. To preview and contribute to a reader’s navigation of the whole article;
4. To give reviewers a roadmap of the paper that they are reviewing.

That’s a big job for such a small amount of text! However, there are a few helpful and specific goals and some

1. Gladon, R. J., Graves, W. R., & Kelly, J. M. (2011). *Getting published in the life sciences*. John Wiley & Sons.
2. Swales, J., & Feak, C. (2009). *Abstracts and the writing of abstracts* / John M. Swales, Christine B. Feak. (*Michigan Series in English for Academic & Professional Purposes*).
3. American Psychological Association. (2010). *Publication manual of the American psychological association* (6th ed.). <https://www.apa.org/pubs/books/4200066>
4. Bordage, G., & McCaghie, W. C. (2001). Title, authors, and abstracts. *Academic Medicine*, 76(9), 945-947.
5. Huckin, T. N. (2001). Abstracting from abstracts. In M. Hewings (Ed.), *Academic writing in context*, Birmingham, UK: University of Birmingham Press.
6. Swales, J., & Feak, C. (2009). *Abstracts and the writing of abstracts* / John M. Swales, Christine B. Feak. (*Michigan Series in English for Academic & Professional Purposes*).

guiding questions⁷ that can help you to get started. These goals/strategies coincide with each section (IMRD/C) of the article, so you may also want to review the various goals/strategies in chapters 2-5.

Goal	Guiding Question(s)
Goal 1: Introduce the topic by providing background information and briefly motivating the study.	What is already known about the topic? Why is the topic important?
Goal 2: Present the purpose/goals of the research.	What is this study about?
Goal 3: Explain the methods, materials, participants, and techniques used in the study.	How was the study carried out?
Goal 4: Highlight the most important results.	What was discovered as a result?
Goal 5: Provide an overview of your conclusions by pointing out any implications or recommendations.	What do the findings mean?

Swales & Feak (2009) claim that Goals 2 and 4 are the most common and note that Goal 5 is the least likely to appear in an abstract. This is probably because many researchers write abstracts prior to completing their studies; consequently, it's difficult to explain what the findings mean if the abstract is written ahead of the study's completion.

7. Swales, J., & Feak, C. (2009). *Abstracts and the writing of abstracts* / John M. Swales, Christine B. Feak. (*Michigan Series in English for Academic & Professional Purposes*).

FORMAL FEATURES OF ABSTRACTS: LENGTH, WORD CHOICE, AND GRAMMAR

This section of the chapter will examine the formal features of abstracts, including length, word choice, and some grammatical issues. Please note that this is not a comprehensive guide but rather a few highlights of issues that we feel are particularly relevant to novice researchers.

Length

In their book-length work on abstracts, Swales & Feak (2009)¹ suggest that the first step to writing an abstract is to find out the word or character limit. Indeed, word/character limits are an especially noteworthy aspect of abstracts because they are so often used as a gateway into acceptance — especially for conferences. Swales and Feak present several guidelines for writing abstracts, and the ones relevant to our discussion are as follows:

1. Abstracts in journals are usually between 150-200 words without subheadings (unstructured) or a bit longer (~250 words) if structured (with headings).
2. Disciplinary differences may allow for longer (~500 words or more) abstracts; specifically, those for conference submission are generally longer.
3. The IEEE² uses shorter abstracts (~50 words) for “short communications,” which is a type of article in many of the journals that it publishes.

Although length is often a challenging component of writing an abstract because it’s difficult to summarize an entire study in only a few hundred words, it is a fairly straightforward aspect of this section of a research article. Each journal has specific requirements for their abstracts, so you can look up their maximum word lengths on their website.

1. Swales, J., & Feak, C. (2009). *Abstracts and the writing of abstracts* / John M. Swales, Christine B. Feak. (*Michigan Series in English for Academic & Professional Purposes*).

2. Institute of Electrical and Electronics Engineers

Word Choice

The primary determinant of the language used in an abstract is its function/purpose. The purpose drives the decisions you will make about what kinds of words and information to use or avoid. Prescriptive guidelines for abstracts are usually dictated by either the discipline or the journal/editor, and, as Swales & Feak (2012) note, there are often “not rules to follow, but rather choices you can make”³ about what language to include or exclude. The next sections provide some guidance to help you make those choices, and although we are including these in the chapter on Abstracts, the information can be applied to any aspect of research writing.

As the abstract is a prominent way for others to be introduced to your research⁴, it is particularly important that the language be clear and appropriate. Several research writing guide books claim that because of the heavy reading requirements that researchers face, they must be extremely selective about what they choose to read. Many choose to read abstracts as a summary of an article either as a preview or a replacement.⁵⁶

One way to begin drafting your abstract is to consider that both its placement and function within an RA is to bridge the title and the text of the manuscript. Therefore, one best practice is to include every important word from the title in the abstract⁷. This will help you consider the content of the abstract, but there are other considerations as well. For instance, generally abstracts present information in the same order as the research article: IMRD/C. As noted previously, the final section may or may not be included based on what stage the research is in, but regardless, the abstract will flow in this general order/pattern.

Next, we’ll explore some particular word/grammatical categories in an effort to provide you with some ideas. These are not rules, but rather, are suggestions based on linguistic research and general academic writing standards.

Pronouns

The use of personal pronouns (e.g., *I*, *me*, *my*, *you*, *s/he*, *you*, *they*, etc.) in academic writing are a common source of confusion for many graduate students and other novice academic writers. Are pronouns acceptable

3. Swales, J. M., & Feak, C. B. (2004). *Academic writing for graduate students: Essential tasks and skills* (Vol. 1). Ann Arbor, MI: University of Michigan Press.

4. Day, R. A., & Gastel, B. (2006). *How to write and publish a scientific article*, 3rd ed. Cambridge: Cambridge University Press.

5. Gladon, R. J., Graves, W. R., & Kelly, J. M. (2011). *Getting published in the life sciences*. John Wiley & Sons.

6. Swales, J., & Feak, C. (2009). *Abstracts and the writing of abstracts* / John M. Swales, Christine B. Feak. (*Michigan Series in English for Academic & Professional Purposes*).

7. Lebrun, J. L. (2007). *Scientific writing. A reader and writer's guide*. World Scientific Publishing Co., Singapore.

in formal academic writing? Should they be avoided? If you are writing about someone else's work, the third person "they" or "s/he" is widely accepted. In contrast, the use of the second person "you" is typically avoided⁸.

In general, there is much variation in the use of personal pronouns in academic writing even among expert writers⁹. Most writing style guides advise against the use of first and second pronouns and the use of the singular masculine he¹⁰. Often the suggestions about alternative structures include the use of passive voice, the combined *s/he* (which can be formed as *she/he*, *he/she*, or with the conjunction *and* between the two), or *they* regardless of gender and number. In fact, studies show that the singular pronoun *they* is the most frequent personal pronoun, and has been for at least two decades¹¹¹²¹³.

Given this information, we suggest that the use of *they* is very likely the best choice regardless of the number (singular or plural) or gender. That is, the pronoun *they* can have antecedents that are male, female, singular, or plural.

Verbs

Tense

Generally, the use of verb tenses varies by section within an abstract. Swales and Feak's comprehensive guide to academic writing¹⁴ asserts that abstracts tend to begin and end in the present tense but vary significantly in their mid-sections. While there has not been a large, cross-disciplinary study of verb tenses in research article

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8. Hyland, K., & Jiang, F. K. (2017). Is academic writing becoming more informal?. *English for Specific Purposes*, 45, 40-51.
 9. Harwood, N. (2006). (In)appropriate personal pronoun use in political science: A qualitative study and a proposed heuristic for future research. *Written Communication*, 23, 242-250.
 10. Paterson, L. (2014). *British pronoun use, prescription, and processing: Linguistic and social influences affecting 'they' and 'he'*. Springer.
 11. Baranowski, M. (2002). The most recent APA guidelines (7th edition) similar support the use of *they* as a third person singular pronoun. Current usage of the epicene pronoun in written English. *Journal of Sociolinguistics*, 6(3), 378-397.
 12. LaScotte, D. K. (2016). Singular *they*: An empirical study of generic pronoun use. *American Speech*, 91(1), 62-80.
 13. Newman, M. (1992). Pronominal disagreements: The stubborn problem of singular epicene antecedents. *Language in Society*, 21(3), 447-475.
 14. Swales, J. M., & Feak, C. B. (2004). *Academic writing for graduate students: Essential tasks and skills* (Vol. 1). Ann Arbor, MI: University of Michigan Press.

abstracts, there have been some studies about specific disciplines such as applied linguistics¹⁵ and medical research¹⁶. The latter study found that past tense is often used to write about the purpose/background of the article, to explain the Methods, and to highlight the most significant Results. However, that study also notes that when a writer wants to focus on the generalizability or boost the significance of the findings, authors will often opt for present tense. Note the difference in the strength of these two sentences:

1. Our results showed that there were significant differences between the two types of X.
2. Our results show that there are significant differences in the two types of X.

The second sentence presents a stronger stance simply because it is in the present tense, which is typically used for facts, general truths, or fixed circumstances. Simple past tense is used for actions started and finished in the past but not necessarily continuing into the present. Therefore, choose your tense carefully because it can be indirect evidence of your stance.

Modality

Modal verbs indicate stance; in other words, they allow the writer to strengthen or weaken a claim. In English, there are nine modal verbs as shown in the table:

can	could	may
might	should	must
had better	ought to	will/shall ¹⁷

It's important to note that each verb carries a level of certainty or doubt that is a really useful way to hedge or boost your claims about findings. Since the abstract is such an important part of representing your work, the careful use of modals is essential to striking the right tone in terms of your level of confidence. Of course, there are other words you can use that also indicate the tentative nature of your work (e.g., adverbs and adjectives such as *possibly/possibly*, *obviously/obvious*, etc.). You can explore those on your own as they are outside the scope of this book. The important point to remember is that you always have a choice about presenting your level of certainty, and modal verbs are important tools in your writing toolbox.

15. Tseng, F. (2011). Analyses of Move Structure and Verb Tense of Research Article Abstracts in Applied Linguistics. *International Journal of English Linguistics*, 1(2), 27.

16. Salager-Meyer, F. (1992). A text-type and move analysis study of verb tense and modality distribution in medical English abstracts. *English for Specific Purposes*, 11(2), 93-113.

17. The modal "shall" is not typically used in American English, but is somewhat common in British English to make suggestions or offer help in either statement or question form.

Clauses with *that*

In 2005, linguistic researchers did a study of over 200 abstracts from six disciplines. The most important finding from the study was that writers tended to use *that* clauses when writing about their results. For example, “The study’s results indicate that ...” or “The findings confirm that ...”. In the full research article, you’ll probably be using these clauses in the Introduction to review literature (e.g., “Other studies have shown that ...”) as well as to report the findings in the Results section. However, in an abstract, you will not be reviewing literature at such a fine level of detail, so it’s more likely that you’ll use such a clause to highlight your findings.

Reporting verbs are often used with the word *that* to form such clauses. So, it’s important for you to familiarize yourself with some of the more common reporting verbs. A few highly-frequent verbs of this type are presented in the table below:

describe	show	reveal
study	demonstrate	note
point out	indicate	report
observe	assume	claim
assert	examine	state
believe	mention	propose
argue	discuss	find
suggest	focus	provide
write		

Each verb conveys a level of certainty of its own (e.g., *assert* is more confident than *indicate*), so be sure that you are familiar with the exact meaning of each verb. On top of that inherent meaning, such verbs can be combined with adverbs (e.g., *possibly*, *certainly*, etc.) and/or modal verbs that can strengthen or weaken the claim as well.

Citations in Abstracts

To cite or not to cite, that is the question. If you do a Google search “Can I cite sources in my abstract?” you’ll find an overwhelming number of negative responses (i.e., No, you should not.). However, as we’ve noted in other sections, academic writing is often not black and white, wrong or right, no or yes. So, while the internet

majority may have very sure opinions, it's less clear than it seems. People provide several reasons why citations in abstracts should be avoided, namely the following:

- To focus on your work, not someone else's.
- To present a self-contained work without the need for outside reference.
- To reduce unnecessary words contributing to the small word count limit.

On the other hand, there may be some instances in which it is incumbent upon you to cite the work of others. When you are doing research that is a direct response to another researchers' findings, theories, or claims, then it's important to cite them. Likewise, if you are using a little-known term that was coined by someone in particular, then it's important to reference that person. And undoubtedly, when you are doing a replication study or some meta-analyses, it's necessary to have citations.

On the whole, though, the best practice is not to cite sources in an abstract unless it is absolutely necessary¹⁸. As with other topics in this book, there are different approaches within disciplines, journals, and writers, who may all have variable stylistic approaches to this issue, so read the Instructions for Authors for your target journal. If there are no guidelines, then examine the abstracts of previously published papers in that journal to see what the common rule seems to be. If all else fails, you can contact the editor.

18. Belcher, W. L. (2009). *Writing your journal article in 12 weeks: A guide to academic publishing success*. Thousand Oaks, CA: Sage.

SUMMARY: WRITING THE ABSTRACT

In this chapter, we learned how to write an abstract for a research article. Five goals were presented as a way to envision the communicative functions of the abstract.

Goal 1: Introduce the topic by providing background information and briefly motivating the study.

Goal 2: Present the purpose/goals of the research.

Goal 3: Explain the methods, materials, participants, and techniques used in the study.

Goal 4: Highlight the most important results.

Goal 5: Provide an overview of your conclusions through implications or recommendations.

By using knowledge of these goals along with their guiding questions, research writers have a target for achieving a concise yet clear summary of their work. As with so many other aspects of a journal manuscript, there are variations at the level of writer, journal, and discipline, so we cannot provide prescriptive rules about what should or should not be included. Pay attention to the Author Instructions for the journal to which you are submitting, and notice what other writers in your field and in your target journal do.



Key Takeaways

- By using knowledge of these goals along with their guiding questions, research writers have a target for achieving a concise yet clear summary of their work.
- As with so many other aspects of a journal manuscript, there are variations at the level of writer, journal, and discipline, so we cannot provide prescriptive rules about what should or should not be included.
- Pay attention to the Author Instructions for the journal to which you are submitting, and notice what other writers in your field and in your target journal do.



Explore + Apply

Make a list of the journals that are ideal publication venues for your research. Explore their author guidelines to see what kinds of standards they set for writing abstracts. Note the length, format (structured or unstructured), and any other suggestions or requirements they have for writing this very short yet crucial piece of the research writing puzzle. Using this information, model your own abstract on the functions and language you see used in such writing in your field.

CHAPTER 7: PREPARING TO PUBLISH



Learning Objectives

After completing this chapter, you should be able to:

- Identify key factors for selecting an appropriate target journal.
- Locate and adhere to a journal's Author Guidelines.
- Apply strategies to heighten searchability of your article.
- Understand expectations of the peer review process.
- Maximize effectiveness of communication with peer reviewers and editors.

SELECTING A TARGET JOURNAL

Factors to Consider when Selecting a Target Journal

Choosing the right journal will increase your chances of getting your work published in a timely way. There is no one correct answer to the question of what is the “right journal.” Rather, here are list of factors to consider when choosing a journal:

- Scope and aim of journal
 - Journal impact
 - Time to publication
 - Charges and costs
-

Scope and Aim of Journal

The purpose of the scope and aims is to specify the types of manuscripts the journal is looking to publish and to indicate the **journal’s target readership**. Choosing the appropriate journal ensures that your work reaches the appropriate audience. Additionally, it increases the chances that your article will be accepted by this journal. A good rule of thumb is that the journals that you most often cited in your Introduction and Discussion sections will be most likely to accept work in your field.

Journal Metrics

A number of measures have been developed to assess the contribution of a journal to a research discipline over time. Some common measures include **Journal Impact Factor**, or IF, (number of citations over 2 years), **H-indexes** (number of publications over number of times cited), and journal **acceptance and rejection rates**. It is important to note that these metrics can be an overly simplistic view of an article’s contribution to the field. For example, IFs do not take into account book chapters or publications that are not in English. For a more comprehensive understanding on this topic, please visit the [*Surviving Research Publication research impact guide*](#).

Time to Publication

Some authors might want to publish their research quickly to ensure others do not publish similar work before them. If this is important to you, you should check journal websites to see what the reported average time to publication is. Journal publication speed is typically influenced by **peer review timelines** (the more efficient, the shorter the timeline), whether a journal is **online or print** (online will publish ahead of or more quickly than print), and **frequency of issues** (monthly journals will have shorter wait times compared to quarterly journals). Below is a screenshot from the Journal of *AI Open* listing its decisions, peer review process, and acceptance timelines.

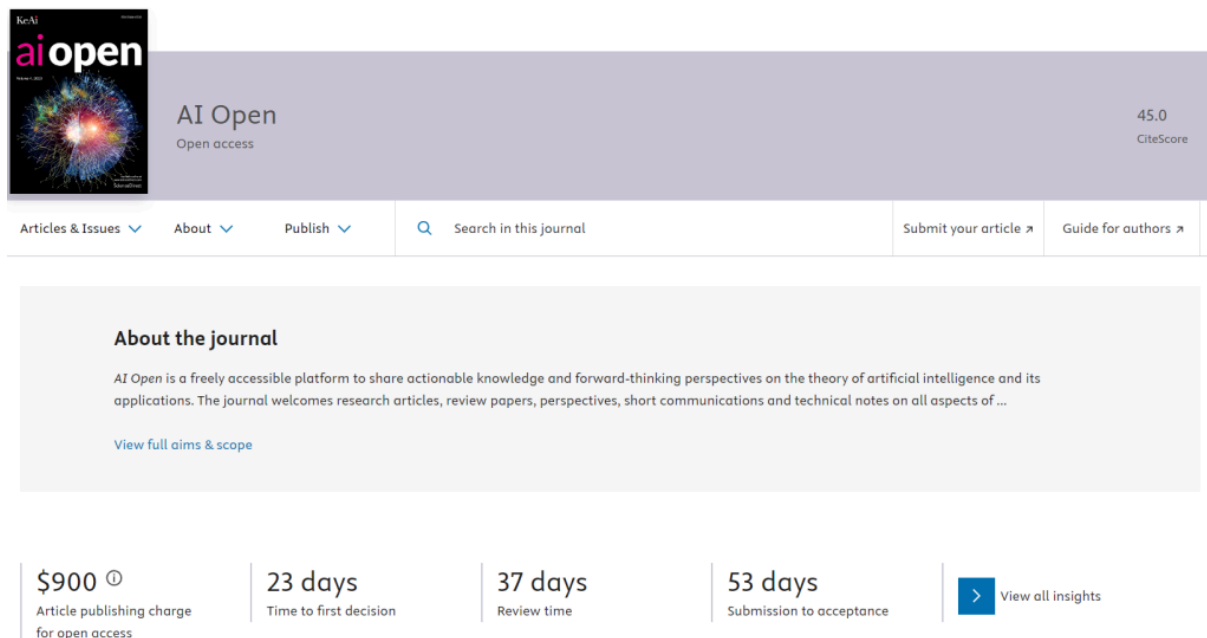


Figure 7.1 Screenshot of AI Open Journal

Charges and Costs

Some journals charge fees for publishing manuscripts. Check whether your target journal charges for any part of the publication process before you submit your manuscript. Publication charges may include **color charges** (for figures presented in color in both print and online publications), **page or excess-page charges** (for when your article is over a certain number of pages specified by the journal), **submission fees** (for publications which cost money to submit to, though this is rarer), and **article processing charges (APCs)**, which refer to fees that some publishers charge to recoup costs while making the article free to

read (i.e., open access)¹. You can see many of these examples presented on publisher websites like ASME's [Publication Charges webpage](#).

Open Access

Open Access (OA) work is more visible because people do not have to pay to access your article. OA works get higher citations and commonly are cited by more diverse readers and researchers, showing that your research has reached a wider audience by being freely accessible than it might have otherwise². Check out other benefits for OA at [the OA website](#).

Avenues to Open Access

If you want your research to be accessible to a wide range of readers, consider offering Open Access (OA) to your paper so that it is available and free for download without subscription to the journal. For a more comprehensive guide on Open Access publishing, please visit the [Surviving Research Publication copyright guide](#). At a high level, you can make your work OA through **two main avenues**:

1. Publishing your work with a traditional journal and sharing a copy of your manuscript in an open access repository like the ISU Digital Repository.
2. Publishing your work with a publisher that supports OA publishing. This may require the payment of an article processing charge (APC), or it may be a service that the publisher provides at no cost. Check your journal's website for additional information about their Open Access options.

You can see these options and more explored in this video:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://iastate.pressbooks.pub/isudp-2026-252/?p=636>

1. A. Elder, personal communication, Sept 23, 2023

2. Huang, CK., Neylon, C., Montgomery, L. et al. Open access research outputs also receive more diverse citations. *Scientometrics* 129, 825–845 (2024). <https://doi.org/10.1007/s11192-023-04894-0>

Review

Now, let's practice looking for the Aims and Scope of different journals with a scavenger hunt!



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<https://iastate.pressbooks.pub/isudp-2026-252/?p=636#h5p-46>

Start narrowing down potential journals for your research topic



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<https://iastate.pressbooks.pub/isudp-2026-252/?p=636#h5p-47>

PREPARING TO SUBMIT

Author's Guidelines

When choosing a target journal, carefully review the author's guidelines to ensure your article is a good fit and that you meet all publishing requirements. This increases the likelihood of a smooth review process. Here are some key things to look out for:

1. **Article types:** Identify whether the journal accepts the type of submission you are planning, such as original research, reviews, or case studies.
2. **Word limit:** Confirm that your manuscript fits within the specified word limit. Exceeding these limits can lead to rejection.
3. **Formatting guidelines:** Make sure you adhere to the journal's specific formatting guidelines for the manuscript, figures, and references. This includes font size, line spacing, and section headings. For more detailed considerations for digital accessibility, see [*Surviving Research Publication final formatting*](#).

Important Note

Watch out for predatory journals! The peer-review process is very important for establishing the quality of your work. To maintain the integrity of your research profile, you should only seek peer-reviewed journals in which to publish. For more information on this, please visit the [*guide to Surviving Research Publication*](#).

Title

The title is likely the first thing a reader sees so needs to be crafted with the reader in mind. The title should help to facilitate retrieval of the article during a search of the literature associated with a topic that is of interest to the searcher. The title is so crucial because it:

1. **describes** the content of the entire manuscript

2. **distinguishes** this document from all others in the field
3. helps the reader **decide** whether to read the entire article

The title should contain high impact words. In most cases, a prospective reader peruses the title for two seconds or less and then makes a decision about reading the paper (Lebrun, 2007). In other words, do not waste space or time on words that do nothing to help describe or elevate your article. In almost every case, the title should not be a sentence, but instead an intentionally composed set of words that are both understandable and retrievable by some form of indexing service.

Byline and Keywords

Bylines are simply a listing of the author(s) of the manuscript and, in some journals, also contain the location(s) where the research was completed, the affiliation(s) of the author(s), and sometimes, the rank or title of each coauthor. The byline is needed, at the most basic level, because it identifies who has taken complete responsibility for the entire scope of work that constitutes the manuscript. It also presents information about how to contact the author(s).

Keywords are needed because they are used by indexing services to help readers, literature searchers, and others “find” your particular article among the thousands of articles that are published in a given time period. Keywords may be simple, single words or they may be an amalgamation of several words (a phrase). “High impact” words that are in the title automatically become keywords in nearly all journals.

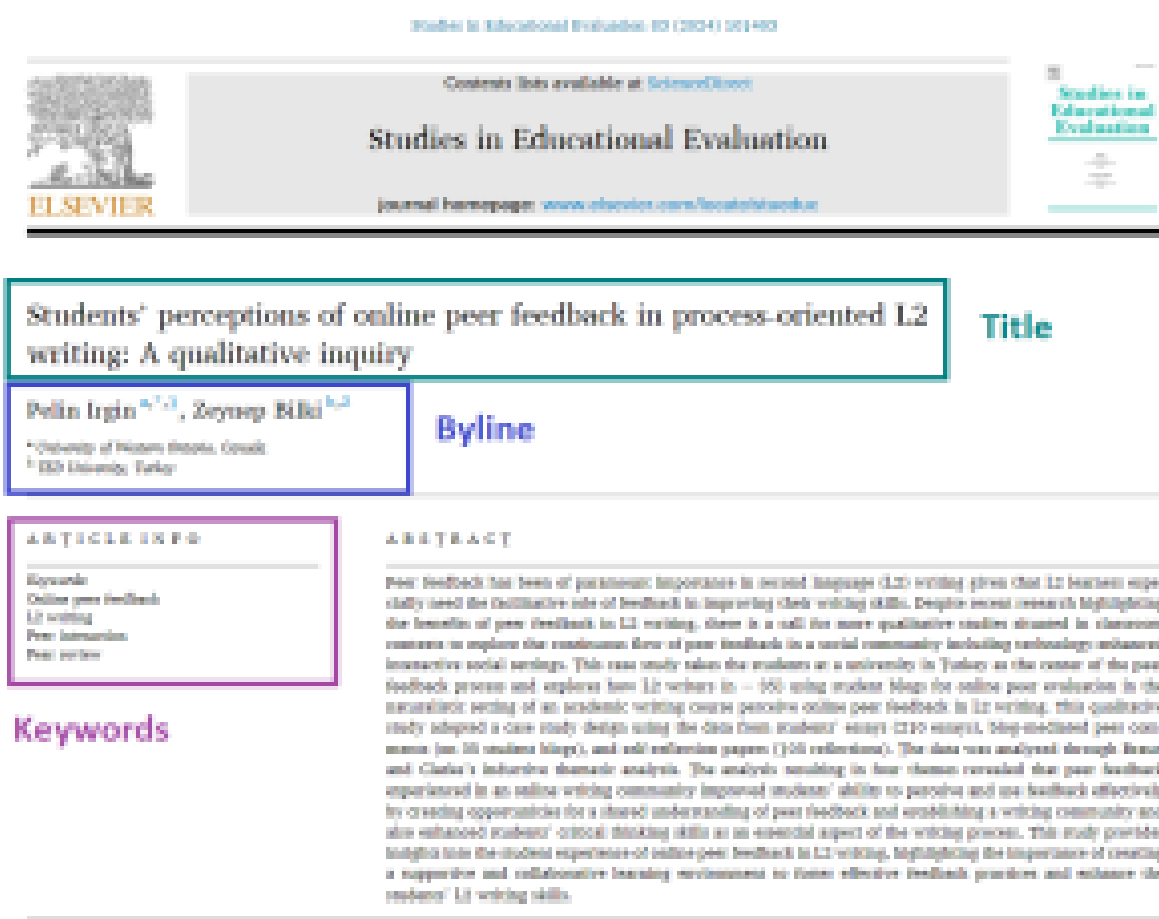


Figure 7.2 Screenshot of a journal article indicating the title, byline, and keywords.

Content adapted from Preparing to Submit Your Manuscript ¹

1. Content adapted from Gladon, R. J., Graves, W. R., & Kelly, J. M. (2011). *Getting Published in the Life Sciences*. Links to an external site. Hoboken, NJ: Wiley-Blackwell. Online Library Access

Practice

Now, let's practice crafting a title for our journal article!



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://iastate.pressbooks.pub/isudp-2026-252/?p=640#h5p-49>

UNDERSTANDING THE PEER REVIEW PROCESS

The Peer Review Process

Upon receipt of the manuscript, the Editor typically determines if the article is a good fit for the journal. If it falls within the aims and scopes of the journal, the Editor will then send the manuscript to two to four independent reviewers with expertise in the subject of the work. The reviewers will review and comment on the manuscript, and send it back to the Editor. With the feedback from the independent reviewers, the Editor will make a decision about the fate of the manuscript, which usually falls into one of these categories:

1. Accept as is
2. Revise and resubmit
3. Reject

If the author's article is not rejected, then they move through a process of revising and resubmitting to the journal until the reviewers and Editors are satisfied with the quality of the article. Once fully accepted, the article moves onto the production phase, and finally, the publication phase. For a more comprehensive guide, please visit the [*Surviving Research Publication* guide to demystifying the publishing process](#).

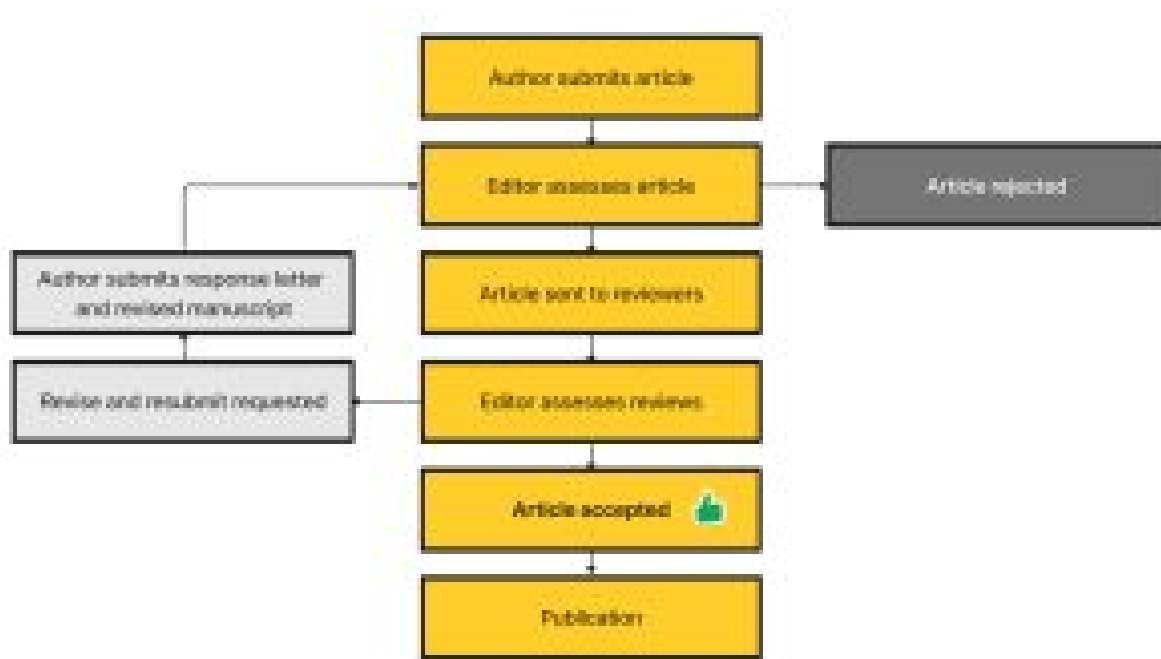


Figure 7.3 The Peer Review Process

Revision and Resubmission

Under a revise and resubmit, the author(s) must revise the manuscript as directed by the comments and opinions of the reviewers. The corresponding author must include a response letter in which they delineate the changes they have accepted and incorporated and which changes they have declined to make, as well as their justification(s) for not making those changes. In some cases, the author(s) may decide the reviewers and Editor were so hard on the manuscript that they would be better off submitting it elsewhere. That is perfectly okay!

Writing the Response Letter

Congratulations! If you are ready to prepare a response letter, chances are good that you have nearly reached your goal of acceptance of your manuscript for publication. As mentioned above, you will need to prepare a response letter. The response letter should address the comments from the reviewers and the Editor, and effective letters contain the below characteristics that will help in getting the manuscript through this resubmission process:

Be thorough

You must deal with each and every reviewer comment in some way. A useful technique that helps with making

your letter excessively long is to write an encompassing statement regarding relatively minor comments. You might say, “My coauthors and I have made all editorial and grammatical corrections suggested by the reviewers, except those delineated below.” This statement lets the Editor know that you were attentive to the suggestions.

Be respectful

Respectfulness is a must. Do not agitate your Editor. Be polite and professional no matter how angry, insulted, or upset you were when you read and acted upon your reviews. Often, the best thing you can do is wait a day or two to regain your composure before you work on the response letter and the revision of the manuscript!

Be assertive but humble

Remain assertive. If you are not willing to argue on behalf of your paper, nobody will. Remind the Editor of the contributions will make to the field of study, yet remain humble in the process. Convey that you recognize the limitations contained in your manuscript, yet do not diminish the value of what you have accomplished and be confident that your article deserves to be published.

Be open-minded

Remain open for further questions, requirements, and criticisms. Relay in your letter that you have been reflective and appreciative of the work of the reviewers, are grateful for the opportunity to make revisions, and remain open to additional suggestions.

Revising the Manuscript

The key to revising the manuscript is to keep detailed records for all changes you have made and justify all changes you feel you cannot make. Your detailed account should include reference to each page, paragraph, and line of the manuscript where you have made a change that was significant. These are important as they will become part of your response letter. Here are some logistical tips:

1. **Create a master list of reviewer comments**

This gives you a clear list of every point to address and allows you to track progress as you make changes. A common strategy is to also group feedback into minor comments and major comments.

2. **Copy your original document**

Always create a copy to work on for revisions. This helps preserve the initial version in case you need to refer back to it or provide a comparison later.

3. Use track changes

Enable track changes so that all edits are marked. This allows you to see what's been modified and makes it easier for reviewers or the Editor to review the revisions.

4. Label your files clearly

Use clear and consistent file names when saving versions of your document. A common strategy is to name your files according to the version number, such as: "YourPaperName_V1.docx". On your second revision, accept the changes (if the Editor made any and if you agree with them), track your revisions again, and rename this file "YourPaperName_V2.docx".

Important Note: Receiving Reviewers' Feedback

Sometimes, reviewers' feedback can come across as harsh! However, it is important to remember that the reviewers are critiquing your work, not you as a person. Give yourself time to process the emotions that come with receiving criticism. It is normal to feel disappointed, frustrated, hurt, or even angry after receiving harsh feedback. Give yourself a "cool down" period before tackling the revisions. When you feel ready to start the resubmission process, remind yourself that this is an opportunity to improve both your writing and research skills, and that is a necessary process in becoming a stronger scholar. For more a more comprehensive guide, please visit the [Surviving Research Publication authorship guide](#).

Content adapted from Response Letter Preparation and Manuscript Resubmission¹

1. Content adapted from Gladon, R. J., Graves, W. R., & Kelly, J. M. (2011). *Getting Published in the Life Sciences*. Links to an external site. Hoboken, NJ: Wiley-Blackwell. Online Library Access

WHAT'S NEXT?

Moving Forward

Writing is never truly finished! It grows with you as you develop as both a researcher and a writer. Each challenge you encounter, whether through feedback or revision, is an opportunity to learn, adjust, and improve. The process may feel repetitive at times, but every draft brings new insights and refines your skills.

As you finalize a written draft, we encourage you to firstly, take time to reflect on the whole process (pre-writing, selecting a journal, reviewing literature, drafting, revising, submitting, revising again, communicating with Editor or reviewers, and publishing). Think about your own role in the process, then think about others' contributions to this work. Did you have assistance with preparing the data or writing the manuscript? Did a mentor steer you towards publication in a certain journal over another? What role did the reviewers' feedback have on the quality, final version of the manuscript? In retrospect, what would you have done differently and how can this impact your next research write-up? Taking time to reflect on the entire journal helps you understand both setbacks and triumphs and helps prepare you for your future research writing.

With practice, you'll not only catch and avoid past mistakes but also become more comfortable navigating the complexities of academic writing. Keep engaging with the process, stay open to growth, and trust that each step moves you forward. Good luck!

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Sarah Huffman, PhD, is the Assistant Director of the Graduate College's Center for Communication Excellence at Iowa State University. Her research interests include genre analysis and academic writing instruction, best practices for training graduate student writing tutors, and systemic functional linguistic approaches to language development. Dr. Huffman teaches graduate-level courses in advanced academic communication and research writing and science communication.

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- Academic Communication Program: Research Writing Seminar Series (2013 – present)

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- Cotos, E., Huffman, S., & Link, S. (2020). Understanding graduate writers' interaction with and impact of RWT during revision. *Journal of Writing Research*, 12(1), 187-232.
- Cotos, E., Link, S., & Huffman, S. (2017). Effects of DDL technology on genre learning. *Language Learning and Technology*, 21(3), 104–130.
- Cotos, E., Huffman, S., & Link, S. (2017). A move/step model for Methods sections: Demonstrating rigour and credibility. *English for Specific Purposes*, 46, 90–106.
- Cotos, E., Link, S., & Huffman, S. (2016). Studying disciplinary corpora to teach the craft of Discussion. *Writing & Pedagogy*, 8, 33–64.
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