Chapter 11

Making Claims in Papers and Talks

Barbara A. Spellman, Judy DeLoache, & Robert A. Bjork

Introduction

Developing and Assessing Your Claim

- **What is a "Claim"?**
- **Types of Claims**
- **Thinking Critically about Your Own Claim**
- **On Being the Right Size**

Communicating Your Claim in a Manuscript

- **Abstract**
- **Title**
- **Introduction**
- **Results**
- **Discussion**

Communicating Your Claim in a Talk

Last Words

"Getting stuff published is easier than getting people to read what you've published."

-- Dennis Proffitt

Introduction

So, you've done some research and have some interesting results; perhaps you've even written drafts of your method and results sections. Now you have to write your introduction and discussion and figure out how to present your research to the world outside your lab. In addition to describing what you found, how are you going to frame the contribution of your research to psychology? In other words, what claims will you make?

This chapter is about how to make claims; that is, how to develop and communicate the sorts of arguments that make for informative, interesting, and persuasive papers and talks. In the first part of the chapter, we describe different types of claims and discuss how to assess your claim; that is, how to create an argument of "the right size." In the second part, we discuss when and how to communicate your claim; that is, how to use the standard formats of papers and talks to your best advantage. Although we write in terms of empirical papers, these strategies are also relevant for review papers and talks. In the last part of the chapter, we offer tips specific to giving talks.

We believe that this chapter—focusing on the appropriate way to make research-based claims—will be of particular benefit to fledgling psychologists. We admire Neal Miller's aphorism: "Be bold in what you try, cautious in what you claim." Good science requires bold thinking. Simply taking the next obvious step in a program of research can be important, even necessary, but major advances depend on the Star Trek approach—"to boldly go where no [psychologist] has gone before."

Having been bold in asking a research question and designing relevant tests, it is, as Miller noted, important to be cautious in what you claim. Some researchers consistently overstate the strength or importance of their results—something that does no credit to themselves or to the field. Our concern is not so much with overstatement, however, but with understatement of the value and contribution of one's research. In our experience, psychologists—and especially junior investigators—often err on the side of being overly cautious, taking a defensive approach that (like the overly-bold approach) does no credit to

themselves or to the field. Thus, a primary focus of this chapter is on suggestions for how to make *appropriately* strong claims for your research.

Developing and Assessing Your Claim

What is a "Claim"?

Your claim is your statement of what your research encompasses and what it contributes. It goes beyond just describing what you did and what you found. You want to communicate not only the outcome but also the value of what you have done—how what you have done fits into existing research and adds to existing knowledge.

You should be able to state your claim in two or three sentences when you are explaining your research to someone, even though you might never use those exact sentences in your paper.

Types of Claims

What are some types of claims? Below we illustrate five different kinds of claims with sentences from selected abstracts, introductions, and discussions of articles recently published in *Psychological Science*. Our examples are chosen to show the importance of making a clear, explicit, straightforward statement about the contribution of the research.

1. Claims of novelty or innovation. Your claim may be that you have devised a new method or approach, discovered a new phenomenon, or generated a new theory. Note that your claim should not be that you have new data—it is assumed that you do. Your job is to situate your new data within the appropriate claim.

> "We describe a new method for mapping spatial attention that reveals a pooling of attention in the hemifield opposite a peripheral flash." Tse, Sheinberg, & Logothetis (March 2003).[1]

"We developed a strategy based on classic signal detection theory that combined elements from these three [previously described] approaches in a naturalistic daily experience study." Gable, Reis, & Downey (March 2003).

"We demonstrate a new bias in children's belief-desire reasoning." Friedman & Leslie (August 2004).

2. Claims of theoretical progress or refinement. Your claim may be that you have extended a previous theory to cover new data; or that you have found, tested, and verified non-obvious predictions of an old theory; or that your results constrain existing theories.

"This finding adds a new perspective to classic theories of interference and recovery…" Lustig, Konkel, & Jacoby (November 2004).

"These findings place powerful constraints on theories of object recognition." Grill-Spector & Kanwisher (February 2005).

"We demonstrate that the compatibility effect depends on people's representation of their selves in space rather than on their physical location." Markman & Brendl (January 2005).

For contrast, we provide the following weak example of a claim of theoretical progress. Although we made it up, it is parallel to actual published language.

Weak Claim: "These findings add to the growing literature indicating that children's preferences for particular facial expressions vary systematically as a function of age and experience."

3. Claims that challenge prevailing interpretations or theories. Your claim may be to challenge or reject an existing theory or interpretation.

> "Overall, these findings challenge the assumption that all positive emotions share the same expression, and suggest that pride may be added to the pantheon of basic emotions generally viewed as evolved responses." Tracy & Robins (May 2004)

> "These results challenge predictions derived from the presumed superiority of discovery approaches in teaching young children basic procedures for early scientific investigations." Klahr & Nigam (October 2004).

4. Claims that challenge conventional wisdom. Your claim may be to overturn—or to verify—some "conventional wisdom" about how people think or behave.

> "We conclude that blind individuals are more accurate than sighted individuals in representing the size of familiar objects because they rely on manual representations, which are less influenced by visual experience than are visual memory representations." Smith, Franz, Joy, & Whitehead (January 2005).

> "…[P]olitical ideology influences how the popular press reports research findings and … such reporting in turn affects readers' beliefs and attitudes. Brescoll & LaFrance (August 2004).

5. Claims that stress the applied importance of your findings. Your claim may be that your results have implications for an important problem, or that your new theory or an existing theory has relevance to an important applied setting.

> "Finding the mechanisms that relate psychometric intelligence to mortality might help in formulating effective interventions to reduce inequalities in health." Deary & Der (January 2005).

> "Our findings make it clear that . . . children profit from gesture when it conveys information that differs from the information conveyed in speech. . . . [T]hese data open the possibility for a heretofore unappreciated technique to improve learning in and out of the classroom." Singer & Goldin-Meadow (February 2005).

> "Our hope is that the current work provides a critical first step toward understanding the factors that influence (and potentially eliminate) racial biases in police officers' responses to criminal suspects." Plant & Peruche (March 2005).

We have just shown you examples of strong versions of five types of common claims. We don't mean to imply that these categories are exhaustive; however, most of your claims will be of one of these types.

Thinking Critically about Your Own Claim

It is no accident that this chapter on "Making Claims" is positioned late in the book. Making a suitable claim requires many of the critical thinking skills discussed in earlier chapters. Three such skills are particularly relevant: (a) creating a coherent story; (b) analyzing arguments; and (c) communicating effectively to others.

Creating a coherent story. Creating a coherent story means pulling together the pieces of what you have done and integrating it with the existing literature. No study stands in isolation; each needs to be presented in context. You need to have read the existing literature with a critical eye to know where your research fits. If, for example, you are making a claim of

theoretical progress or refinement (claim type 2 above) or one that challenges prevailing interpretations or theories (claim type 3 above), you must spend considerable time thinking about the existing theories in order to understand their predictions and limitations. If you are making a claim that stresses the applied importance of your findings (claim type 5 above), you must consider the differences between your experimental conditions and the conditions to which you would like to generalize. For example, if you want to claim that your results have strong implications for optimizing instruction, you need to consider whether your experiments include materials and retention intervals that are realistic from an educational standpoint.

Analyzing your argument. Of all the tools in the successful scientist's toolbox, we believe that the most valuable one is being able to critically analyze one's *own* arguments. Becoming a psychologist means learning to evaluate research—and everyone has plenty of opportunities to read and critique other peoples' research. Unfortunately, it is far less common—and far more difficult—to critique one's own research. Doing so, however, is essential to making a claim that others will take seriously.

Why is it so difficult to evaluate one's own research? For one thing, it is highly likely that you agree with the conclusion. Research has shown that people tend to be more accepting and less critical of arguments with which they agree. In addition, you know more than you have stated in your manuscript; for example, you have read literature that you haven't cited, perhaps run experiments that "didn't work" and aren't included, and probably delved more deeply into your data than your manuscript suggests. You may have, inadvertently, made a coherent argument out of the parts that neatly fit together but left out some of the problematic issues raised along the way.

Communicating your argument to others. The challenges in analyzing one's own arguments are similar to the challenges in evaluating one's own writing. You already know what you have done and why, how it all turned out, and what it means. But your reader does not. You have lots of ideas and information in your head that may not have made their way onto the paper. Your text makes sense and seems to be complete to you because you have automatically

filled in gaps in the flow of thought and logic; however, you need to make sure that you have fully communicated your research in orderly steps so that the reader, too, can appreciate what you have done. You need to present the relevant background concisely; motivate and describe your study in the necessary amount of detail, display your data effectively; interpret your results and draw your conclusions in a clear and understandable way; and, finally, anticipate obvious objections to your interpretation—all so the reader can evaluate your argument and assess the validity of your claim.

Getting it right. What steps can you take to make sure you have done a good job? We have two recommendations. First, after you have written a "full draft" of your manuscript (we don't mean the final draft, we mean the first one that goes from Introduction through Discussion and presents your full argument), put it down for a few days. After this break, pick it up and read it as if you were a first-time reader and it were someone else's manuscript. Be as ruthlessly critical of your own manuscript—both argument and writing style—as you would be of manuscripts written by others. Second, when the manuscript is further along, ask knowledgeable and trusted others to read it. Ask them to be ruthlessly critical, too. (Don't hold it against them if they are—it's for your benefit and they are doing you a favor. Cultivate the art of being grateful for tough feedback.) Make sure that one or two such people are from outside your laboratory. People in the same laboratory group often use the same jargon and accept the same assumptions. At least one of your readers needs to be someone who is smart but naïve to your particular topic; that person can represent the anticipated consumers of your research.

On Being the Right Size[2]

So now that you have critically assessed your research, it is time to state your claim. How bold should your claim be? The best claims are not too big, and not too small, but just right. You should portray your contribution to the field accurately. If you are too conservative, readers or listeners may dismiss your results as inconsequential, in which case neither you, nor your research, will get the credit you deserve. On the other hand, if you are too generous to

yourself, readers or listeners may come to question not only your current claim, but all of the other claims you make as well.

Most graduate students and junior investigators err by making claims that are too timid (although we have also seen undergraduates make claims that are too bold). There are at least three reasons for this common reticence.

First, graduate students often feel overwhelmed and intimidated by the amount of research already done on their topic. How can you make a claim for novelty if you aren't sure that you have read and understood everything previously written about it? What if you missed some article or paragraph or footnote that has already put forward what you want to claim? The answer is that you need only make a good faith effort to ascertain that the claim has not, in fact, already been made. Searching the relevant literature is an obvious part of such an effort, but talking to knowledgeable researchers can also be invaluable. Once your research gets communicated broadly to others in talks, posters, or manuscripts, the self-correcting nature of science will take over. People who come to your talks or posters will offer you information about related work—particularly their own. In addition, when you send a manuscript to a journal, the action editor and, especially, the reviewers, will be familiar with the literature and give you guidance.

If, however, someone tells you "that's already been done," or "I've done that," it's important not to take such comments at face value; instead, you should do some rigorous fact checking of your own. Unfortunately, many people claim too much for the field and for themselves. You should always ask where the research is published. You will then often find that the work referred to differs substantially from your own, or that your work goes beyond the previous findings in an important way, or even that the work referred to was never actually published.

A second contributor to an overly timid approach is the (accurate) belief that your data and interpretation cannot withstand all attacks. You are good enough, and concerned enough, to see the flaws in your data, the potential counterarguments to your interpretation, and the issues

that you failed to address. How can you make a strong claim when so much is lacking? The answer is to recognize that data are rarely "perfect," that not all questions can be answered in a single manuscript, and that more research is (almost) always needed. (A good point to remember, but not appropriate to state in your paper.) Science usually proceeds in small, rather than earth-shaking, increments, so any increments you contribute are valuable.

The final reason why graduate students often make timid claims is because the language of philosophy of science, especially as adopted by psychologists, has implicitly and explicitly taught them to do so. As philosophers of science, and as scientists, we know that no theory with empirical content can ever be proven true. Even after observing 1,000,000 white swans you may still stumble upon a black swan, disproving your theory that all swans are white. We also know (less explicitly) that scientific theories are almost never disproven—at least not by a single observation or experiment. Were you to find that black swan, you might argue that it was really white but had just fallen afoul of an oil slick. Correspondingly, when you confront others with contradictory findings, their first action will not be to abandon their theory; rather, it will be to question your method or data. Eventually, however, they might modify their theory to fit your new data. (To get a good sense of how difficult it is to get people to modify a theory, even when they have approved of the methods, see Mellers, Hertwig, & Kahneman, 2001. This article is an example of an "adversarial collaboration"—in which researchers on different sides of a controversy design studies together in the hope that their results would resolve the controversy.)

Our language of psychology, however, pressures us to be even more timid than just avoiding claims of proof and falsification. As a field, we have adopted the language of tentativeness. We (correctly) never say "our data *prove* X," which would be both overly bold and scientifically illiterate, but we then go too far in the other direction and use overly timid phrases, such as "our data *seem to suggest* X." Our journals are now rife with that sort of language.

As careful readers of this literature, graduate students, who are trying to absorb the culture of academic psychology, will mirror the language around them. You say it that way

because others say it that way. Or, stated in a fashion consistent with the present argument: "It can be inferred that perhaps you say it that way because you might have been influenced by others who have previously said something like it in a similar manner." Do not make that error. If your claim is the right size, you need not be tentative with your language.

Communicating Your Claim in a Manuscript

As mentioned above, we believe that good papers are informative, interesting, and persuasive. Those three characteristics are not independent of each other and nowhere are they more interrelated than when making your claim.

Your entire paper should be an argument for your claim. You begin, of course, with an issue (a question you are going to answer, a theory you are going to extend or limit, etc.). Your introduction should then motivate why the issue is interesting and important; your method should clarify how you hope to gain leverage on the issue; and your results section should be structured to illustrate clearly how your results bear on the issues of interest. Finally, your general discussion should state your conclusions explicitly; acknowledge and then rebut—if you can—potential counterarguments; show how your conclusions might be even more interesting or applicable than they seem at first glance; and tie up all loose ends. At a minimum, the reader should finish reading your article believing you have said something new and interesting.

You claim should be made in several sections of your manuscript.

Abstract

Abstracts are your first—and sometimes your only—chance to make it clear to the reader what you have done and why anyone should care.

Your abstract can function successfully in two quite different ways. One is to motivate the reader to go on and read the whole paper. Think of your abstract as an advertisement—a teaser to entice the reader to want more. To achieve that goal, your abstract has to recruit and hold attention. Unfortunately, abstracts are woefully underutilized as advertising. Most follow the guidelines of the APA *Publication Manual*, describing details from every section of the

manuscript (p. 14). What is frequently left out altogether is what the author claims, the very thing most conducive to achieving the author's primary goal—that is, getting others to *want* to read the paper.

The second way an abstract can be successful is to convey such a good sense of the importance and interest value of the research that a casual reader (e.g., someone in a different field who has stumbled upon your abstract) will understand what you did, what you found, and why it is important. Such an abstract is memorable and leaves a good impression of the work and its author. It may even lead that person to recommend your paper to others.

There are many ways to write a bad abstract: they can easily be too vague, too wordy, too timid, and so on. In particular, abstracts often suffer from being, no pun intended, too abstract. We are appalled by the plethora of abstracts in psychology that read something like this: "In several studies, we investigated A. N participants did B. Results showed C. Implications and conclusions are discussed." What a waste of words! Neither the first nor the last sentence contributes anything. Readers do not care what you investigated; they care what you found and what it means. Telling them "implications and conclusions are discussed" is vacuous. An abstract of the type parodied above tells your reader nothing about what your article contributes to psychology.

Instead of the insipid, uninspired, and uninformative type of abstract that is all too common, make your abstract informative by including your claim. It is more important that your abstract communicate what you believe your research shows than it is to communicate the specific details of what you did to show it.

A good, strong abstract uses clear, strong language. Use the active voice; avoid the passive voice. The active voice communicates power and conviction; the passive voice suggests uncertainty, lack of confidence, and disengagement. The passive voice is also often vague and wordy. Below are some examples of good, active phrases to use in your abstract. These phrases, which highlight your claim, will ideally appear in the first, penultimate, or last sentence of the

abstract, but they should definitely appear somewhere. (And, yes, we like the use of "we" when it means "we-the-coauthors".)

"We demonstrate that…"

"We report…"

"We offer…"

"We argue…"

"We claim…"

Here are some examples of commonly used, non-informative and wordy phrases:

"We examined…"

Even worse, "X was examined."

Still worse, "An experiment examined…" or "This research examined…" or "A study was conducted to examine…." (You almost never need to say "X was examined/investigated/assessed/measured"; instead, that idea can usually be incorporated into the statement of the results.)

"Participants were presented with…" (Did you present them with a gift? Otherwise, participants *did* something—they read or heard or watched or reported.)

We found "an effect of X on Y" or "a relation between X and Y." (How nice, but what was the effect or the nature of the relation?)

And, finally, here's our favorite:

"The theoretical and practical implications of these findings are considered." (We swear this sentence has appeared at least once in *Psychological Science* but we don't want to cite the source. We think the sentence means that they wrote a discussion section. We have also seen variations such as: "The implications of these findings for X are considered." A more informative statement would be: "These findings imply that….")

There are certainly other good ways to start an abstract besides using a "we" sentence. Here are two more good approaches:

1. A question.

"Does knowledge about which objects and settings tend to co-occur affect how people interpret an image?" Davenport & Potter (August 2004).

"When language is correlated with regularities in the world, does it enhance the learning of these regularities?" Yoshida & Smith (February 2005).

2. A statement of existing theory, practice, or conventional wisdom, which sets the background context for your claim. If you find it necessary to start with a statement about the findings of previous research, be sure to avoid the passive voice. Do not simply state: "Previous research has found X." With a little effort, you can figure out a better way to say it. Then immediately contrast this background with your claim. What is your addition, qualification, new approach, or resolution? Note that when referring to previous research, it is particularly good if you can describe a conflict in the previous literature that your research helps to resolve. The following are good examples.

"Contemporary knowledge of infant cognition relies heavily on violation-of-expectation experiments. However…" Newcombe, Sluzenski, & Huttenlocher (March 2005).

"The way people respond to the chance that an unlikely event will occur depends on how the event is described." Koehler & Macchi (August 2004).

"It has become almost a maxim that "talking through" a problem is advantageous. Lane & Schooler (November 2004).

Now compare the following two fictional examples which accentuate some of the points made above.

Word Wasting (bad): “The latency to find a deviant visual pattern was measured as a function of the number of distractor patterns for two age groups—adolescents and adults. Both age groups detected the target stimuli more rapidly when there were fewer distractor stimuli."

Word Saving (good): “Both adolescents and adults found a deviant visual pattern more rapidly when it occurred among a smaller number of distractors."

Note that the top version expends words describing what was measured and mentioning that there were two different groups; the bottom versions incorporates those ideas into the statement of results. The length difference: 20 words versus 41 words! Think what you could do with those extra 21 words in the rest of your 100-word abstract.

Next compare a published abstract that we believe is informative and compelling with a parody of that abstract that illustrates much of what we have said not to do (but which we have often seen in real articles). The abstract is from an article entitled "Visual Recognition: As Soon as You Know It Is There, You Know What It Is" by Kalanit Grill-Spector and Nancy Kanwisher (February 2005). It is 126 words.

Good (real) version: What is the sequence of processing steps involved in visual object recognition? We varied the exposure duration of natural images and measured subjects' performance on three different tasks, each designed to tap a different candidate component process of object recognition. For each exposure duration, accuracy was lower and reaction time longer on a within-category identification task (e.g., distinguishing pigeons from other birds) than on a perceptual categorization task (e.g. birds vs. cars). However, strikingly, at each exposure duration, subjects performed just as quickly and accurately on the

> categorization task as they did on a task requiring only object detection: By the time subjects knew an image contained an object at all, they already knew its category. These findings place powerful constraints on theories of object recognition.

Now consider how the authors might have introduced their work (but fortunately did not) using a slightly different set of 126 words:

> Bad version: Many researchers have tried to determine the sequence of processing steps involved in visual object recognition. This issue was investigated by examining performance on three different tasks: within-category identification, perceptual categorization, and object detection. Each of these tasks was designed to tap a different component process of object recognition. Subjects were presented with natural images at varying exposure durations, and for each task we measured both accuracy and reaction time. Our results showed that, at each exposure duration, subjects' performance on the within category-identification task was slower and less accurate than on the perceptual categorization task but that subjects performed just as quickly and accurately on the categorization task as they did on a task requiring only object detection. Implications of our findings are discussed.

Which of the two abstracts actually tells you something? Which makes you want to find out more? We hope you find the differences as striking as we do.

The bottom line on Abstracts: When you think about how people use abstracts you should realize that they are your first, best, and maybe only chance to make your claim. Be strong and be clear.

Title

Okay, perhaps we exaggerated when we said that abstracts are your first, best, and maybe only, chance to entice a reader. The honor of being the "first"—and sometimes, unfortunately, the "only"—goes to those few words immediately above your abstract: your title. Most of the lessons learned from writing abstracts are applicable to writing titles.

We agree with the APA *Publication Manual* (p. 10) that titles "should summarize the main idea of the paper simply and, if possible, with style." We don't, however, like the example the *Manual* provides: "Effect of Transformed Letters on Reading Speed." That title illustrates what most undergraduates are taught in their research methods class: mention the independent and dependent variables. What it does not do are some of the other useful things that titles can do—including making your claim. Titles, like abstracts, can serve to entice and inform the reader; simply mentioning the variables, without revealing the direction of the finding or situating them within a larger issue or context, does neither.

Consider the following title: "Music Lessons Enhance IQ" (Schellenberg, August 2004). From just those four words you know exactly what the researcher found; in contrast, "The Effect of Music Lessons on IQ" is seven words and much less informative. Notice that the original example and all the following examples do contain the key variables, but the variables are supplemented by an action word that reveals their relation: "Remembering a Location Makes the Eyes Curve Away" (Theeuwes, Olivers, & Chizk, March 2005); "Reaction Time Explains IQ's Association with Death" (Deary & Der, January 2005); and "Toddlers' Responsive Imitation Predicts Preschool-Age Conscience" (Forman, Aksan, & Kochanska, October 2004).

It is good to reveal your results but it is even better to reveal your claim. Theoretical claims are often appropriate for titles: "Fractionating Working Memory: Consolidation and Maintenance Are Independent Processes" (Woodman & Vogel, February 2005); "Partial Awareness Creates the 'Illusion' of Subliminal Semantic Priming" (Kouider & Dupous, February 2004); and "Visual Recognition: As Soon as You Know It Is There, You Know What It

Is" (Grill-Spector & Kanwisher, February 2005; the abstract of this article was also used earlier as an example).

Practical claims are particularly good to have in titles as they create a broad appeal for your work: “Knowing Is Half the Battle: Teaching Stereotype Threat as a Mean of Improving Women’s Math Performance (Johns, Schmader, & Martens, March 2005); “The Symptoms of Resource Scarcity: Judgments of Food and Finances Influence Preferences for Potential Partners (Nelson & Morrison, February 2005); or “When High-Powered People Fail: Working Memory and ‘Choking Under Pressure’ in Math” (Beilock & Carr, February 2005).

We are not advocating that all titles include the entire claim; although you should certainly try to represent your claim, many are too complicated to be conveyed in so few words. Further, even if it is possible to get both your results and a claim within the word limit (which would be especially informative to the reader), the resulting title may be overly long or push the limits of clarity. Although it is definitely best to include a claim, being understandable is of paramount importance.

One final note: although your primary goals are to make the title informative and clear, if it also clever, you have done even better. From recent years in *Psychological Science*, we especially like: “Looking Forward to Looking Backward: The Misprediction of Regret” (Gilbert, Morewedge, Risen, & Wilson, May 2004) and “Show Your Pride: Evidence for a Discrete Emotion Expression” (Tracy & Robins, March 2004).

The bottom line on Titles: A Title may be your only chance to hook the reader. As with the Abstract, you need to balance clarity and brevity. Use the active voice, state what you found not what you investigated, and do your best to represent your claim.

Introduction

It is simple to make the case (as above) that claims should be present in abstracts so that researchers can find relevant papers and will be enticed to read interesting papers. In fact, many published papers do contain claims in the abstracts. It is more difficult to find claims made in

the Introduction of a paper; however, we believe that it is no less important to make them there. We also believe that the reluctance to do so is misguided.

Why are people reluctant to put claims in Introductions? We believe that authors are reluctant to put their claims in the Introduction because they think it ruins the suspense. Authors sometimes get caught up in developing the "story" of their research and then write as if their manuscripts were mystery novels. "What will happen if we do X? Stay tuned and we will reveal, clue by clue, how we solved the mystery." Authors caught up despite the fact that, as writers of empirical papers, we know that the "story" as presented in a manuscript (i.e., the order of the experiments, the predictions, even the research question) is usually not the story of what actually happened when the research was done.

Why should people put claims in Introductions? Although Arthur Conan Doyle would have sold many fewer books were his mysteries solved on page 1, you are not writing a Sherlock Holmes mystery. In fact, the very reason that mystery writers put the "answer" at the end is why you need to put your claim at the beginning. Have you ever gotten to last page of a mystery novel, or the final scene of a movie with a "twist", and then felt that you wanted to go back to the beginning to see whether it all fit together? That is great for book or movie sales, but that is not the kind of time a reader wants to invest in reading your scientific paper. How everything fits together should be obvious all the way through.

In fact, psychologists know that reading something with an "advanced organizer"—a statement that tells you what something is about or where it is going—is much less taxing than reading something without one. You want to keep your readers focused and on task—and all on the "same page." You want to make it easy for them to follow your argument and understand what you are doing and why; you don't want them to have to keep seemingly unrelated pieces of information in their heads until you provide them with the unifying "twist" at the end.

Where should people put claims in Introductions? As with the abstract, the claim might appear in the first sentence of your Introduction, or you might have some work to do before you can get to the claim. You might first need to set up the background against which you can

contrast your finding (e.g., explain existing theories or prevailing conventional wisdom). You might want to introduce the research area or problem in some engaging manner. Regardless, somewhere in the Introduction, before your reader starts wondering why she is reading about the search for intelligent life in the universe, you should make your claim.

Other sources of examples. Many excellent examples of strong ways to introduce your claim very early in your paper can be found in the work of professional science writers. The following are a few representative examples. Notice how the authors immediately get to the point of the research and what it shows. Also, notice how much information is packed into every sentence. Although journal articles are typically much longer than these types of pieces, we think the direct approach is equally valuable there.

> "A part of the brain that's involved in sound processing shows pronounced activity when rhesus monkeys hear their comrades vocalizing but not when the same animals hear other sounds, a new brain-scan investigation finds." [Bower, B. (February 14, 2004). *Science News, 165*, 109.]

> "How quickly babies home in on the sounds of their native language during their first year may predict how quickly they learn new words, string together complex sentences, and acquire other language skills as toddlers." [Miller, G. (2004). *Science* (News Focus), *306*, 1127.]

> "Three British men who suffered left brain damage that undermined their capacity to speak and understand language still possess a firm grasp of mathematics. . . . This observation dramatically illustrates the presence of separate brain systems for language and numbers." [B. Bower. (February 19, 2005). *Science News, 167*, p. 117.]

> "Babies exposed to lead in the womb may be at increased risk of developing schizophrenia as adults." [H. Pearson. (February 17, 2004). *Nature Science Update*.]

> "In Southern Asia, where an estimated 75 million children qualify as malnourished, lack of food may only be part of the problem. A prospective study in rural Pakistan finds that mothers who became depressed shortly before or after giving birth had babies far more likely to experience stunted growth and bouts of diarrhea than were babies with psychologically healthy mothers." [B. Bower. (September 18, 2004). *Science News, 166*, p. 179.]

Good examples of informative abstracts that make clear claims can also be found in the general journals *Science* and *Nature*.

The bottom line on Introductions: Although it may seem like you are "giving away the ending" when you put your claim in the Introduction, a research article is not a mystery novel. By making it clear, from the very beginning, where you are going and what you found, you will help your readers to follow and evaluate your research

Results

Although not everyone agrees with this recommendation, we believe that you can and should make modest claims in your Results section. It is not the place to make your big claims—only to state what you think your evidence directly shows. You should begin this section with a sentence or paragraph summarizing in a straightforward, non-technical way what you found. Knowing what the general results of the research are at the outset makes it immensely easier for the reader to comprehend the later detailed and technical description of your analyses.

Discussion

The Discussion is, of course, another place where your claim should be clearly stated. In fact, everyone agrees that it should be there, but many people fail to do it effectively. They err by just reiterating their results. The point of the Discussion is to bring it all together—your fascinating question, your delicate methods, and your lovely results—and to show that you have the goods to support your claim. You have fulfilled your promise. The Discussion is also often the place to make and justify claims about the applications of your findings to the real world. Such claims can make a strong ending to a paper.

We want to remind you that writing a paper is an iterative process. No one we know, except possibly the lead editor of this book, can write a paper from start to finish and then be done. Instead we might, for example, write the Method and Results first, then a draft of the Introduction. Next we might start the Discussion, but as we are trying to tie up everything, we might realize that we cannot make our claim as strongly as we would like because we are missing some supporting data. So, we might go back and run some new analyses on our data. Then we revise our Results and Discussion—and then the corresponding lead-in from the Introduction.

If, as we have suggested, you can step back from your own work and be ruthlessly critical during this iterative process, you will end up with a strong and coherent argument—and a claim of exactly the right size.

The bottom line on Discussions: Be sure to have a crisp, succinct, statement of your claim in the Discussion. Your readers will feel satisfied with your work only if, at the end, they fully understand what you have claimed and how your claim is justified.

Communicating Your Claim in a Talk

When you write a manuscript you have two very different goals: one is to do justice to your research, to be interesting, informative, and persuasive, and to make the claim the right size;

the other is to get your manuscript accepted to a journal. In the best of all possible worlds, if you achieve the first goal, the second will follow.

When you give a talk you no longer have the goal of getting the talk accepted; that has already happened. You still, however, must do justice to your research, and in the limited time allotted. How you can best present your research, therefore, differs somewhat between a paper and talk.

Special Considerations in Giving Talks

Our advice regarding talks (especially the 15-minute kind) is that you be aware that it is difficult to communicate effectively in such a short period of time. You need to be selective in what you present, but you also have to be sure that the audience gets the big picture; you may have to sacrifice details, but never sacrifice audience understanding. (It may be important, for example, to give a concrete example of your materials, but not how you achieved a certain counterbalancing.) Preparing a short talk forces you to streamline your argument to its bare essentials. For that reason, giving a short talk on your research can be very helpful as a precursor to writing your manuscript.

Techniques for giving effective talks, and for making claims in talks, are much the same as for papers but somewhat less constrained. For titles and abstracts our advice is identical: an engaging title and an abstract that makes a strong, clear claim will draw a better audience than one that does not. The "rules" about when to make your claim in the actual talk are, however, less rigid. One respected colleague of ours insists that his students begin their talks with a "Take Home Message" (i.e., their claim) as a very early slide. This technique is certainly effective in helping the listener to follow the talk. On the other hand, we believe that the "unfolding mystery" technique—which we don't approve of in papers—can sometimes be used effectively in talks, in part because asking listeners to wait 15 minutes or so for the punch line does not seem excessive. A speaker can use various devices, such as reminders, humor, or rhetorical questions, to keep the listener engaged as the story is revealed. Of course, regardless of style, at the end of

the talk, as in the Discussion section of a paper, you should always make a strong, clear, statement of the claim and how it is supported by the work.

Capturing and Convincing Your Listeners

To capture your audience and to convince them of your claims and the importance of your work, it is important that they not only understand not only your basic problem and method, but also the participants' task and parallels to that task in the real world. Towards that end, it is important to avoid a kind of egocentrism in giving talks—an egocentrism that leads to presenting the research from only your own (i.e., the experimenter's) perspective. Abstract statements about designs, conditions, comparisons, and so forth are difficult for an audience to assimilate. What audiences need in order to follow your rationale and evaluate your claim is a description of the procedure from the participant's viewpoint, including concrete examples of trials, materials, and the typical sequence of events.

In addition to getting your listeners to imagine themselves being participants in your experiment, providing a real-world example or two that illustrates the problem your research addresses is also an effective way to get your listeners to resonate to the goals and importance of your research. The late Amos Tversky, who was famous for his ability to give compelling talks on complex decision-processes research, almost always began his talks by posing a real-world example or a heuristics-and-biases conundrum for his audiences.

Finally, talks provide a great opportunity for you to speculate about *possible* implications or applications of your research. Such speculations need to be clearly identified *as* speculations, but they can be provocative, motivating, and sometimes the main thing listeners will remember and seek you out to discuss. (Of course, speculations may be offered in papers too, but overly daring ones can later be quoted in embarrassing ways should they prove unwarranted.)

The Bottom Line on Giving Talks

Talks, like abstracts, are not full presentations of your research but, rather, are advertisements for your research (and, in fact, advertisements for you). If you need to err at all, err (slightly) in the direction of making your claims and speculations too bold. Be interesting

and be persuasive, and demonstrate that you can make a strong, justified, claim. A successful talk will get people interested and excited enough to remember you and to take the time to find and read, and maybe talk to others about, your research.

Last Words

To summarize our main points:

Work hard to clarify for yourself what your research contributes to psychology; only then will you be in a position to communicate it clearly to others. Giving a short (e.g., 15 minute) talk on your research before you write (or while you are writing) your paper might help you find the essence of your claim.

Avoid being timid or vague when stating your contribution: being bold and clear is the best strategy for you, your research, and the field.

Make sure that your abstract (whether for a paper or a talk)—and your title, too, if possible—communicates your claim.

Make sure that near the end of either a paper or a talk you clearly state your claim and the support for it.

Good luck. We look forward to reading and hearing about your research.

Author Notes

Barbara A. Spellman and Judy DeLoache are at the University of Virginia. Robert A. Bjork is at the University of California, Los Angeles. We would like to thank the members of the Spellman Reasoning & Memory Laboratory, in particular Debby Kermer, for helpful comments on an earlier draft.

Footnotes

[1] Citations to articles from *Psychological Science* have the month and year included to facilitate finding them.

[2] We take the title of this section from the well-written and widely-anthologized Essay by J. B. S. Haldane (1928).

References

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5th ed.). Washington, DC: Author.

Brescoll, V., & LaFrance, M. (2004). The correlates and consequences of newspaper reports of research on sex differences. *Psychological Science*, 15, 515-520.

Cohn, M. A., Mehl, M. R., & Pennebaker, J. W. (2004). Linguistic markers of psychological change surrounding September 11, 2001. *Psychological Science*, 15, 687-693.

Davenport, J. L., & Potter, M. C. (2004). Scene consistency in object and background perception. *Psychological Science*, 15, 559-564.

Deary, I. J., & Der, G. (2005). Reaction time explains IQ's association with death. *Psychological Science*, 16, 64-69.

Friedman, O., & Leslie, A. M. (2004). Mechanisms of belief-desire reasoning: Inhibition and bias. *Psychological Science*, 15, 547-552.

Gable, S., Reis, H.T., & Downey, G. (2003). He said, she said: A quasi-signal detection analysis of daily interactions between close relationship partners. *Psychological Science*, 14, 100-105.

Grill-Spector, K., & Kanwisher, N. (2005). Visual recognition. As soon as you know it is there, you know what it is. *Psychological Science*, 16, 152-160.

Klahr, D., & Nigram, M. (2004). The equivalence of learning paths in early science instruction. Effects of direct instruction and discovery learning. *Psychological Science*, 15, 661-667.

Koehler, J. J., & Macchi, L. (2004). Thinking about low-probability events: An exemplar-cuing theory. *Psychological Science,* 15, 540-546.

Lane, S. M., & Schooler, J. W. (2004). Skimming the surface. Verbal overshadowing of analogical retrieval. *Psychological Science*, 15, 715-719.

Lustig, C., Konkel, A., & Jacoby, L. L. (2004). Which route to recovery? Controlled retrieval and accessibility bias in retroactive interference. *Psychological Science*, 15, 729-735.

Markman, A. B., & Brendl, C. M. (2005). Constraining theories of embodied cognition. *Psychological Science*, 16, 6-10.

Mellers, B., Hertwig, R., & Kahneman, D. (2001). Do frequency representations eliminate conjunction effects? An exercise in adversarial collaboration. *Psychological Science*, 12, 269-275. See also the erratum at Vol 12, page 536.

Newcombe, N. S., Sluzenski, J., & Huttenlocher, J. (2005). Preexisting knowledge versus on-line learning. *Psychological Science*, 16, 222-227.

Plant, E. A., & Peruche, B. M. (2005). The consequences of race for police officers' responses to criminal suspects. *Psychological Science*, 16, 180-183.

Singer, M. A., & Goldin-Meadow, S. (2005). Children learn when their teacher's gestures and speech differ. *Psychological Science*, 16, 85-89.

Smith, M., Franz, E. A., Joy, S. M., & Whitehead, K. (2005). Superior performance of blind compared with sighted individuals on bimanual estimations of object size. *Psychological Science*, 16, 11-14.

Tracy, J. L., & Robins, R. W. (2004). Show your pride: Evidence for a discrete emotion expression. *Psychological Science,* 15, 194-197.

Tse, P. U., Sheinberg, D. L., & Logothetis, N. K. (2003). Attentional enhancement opposite a peripheral flashrevealed using change blindness. *Psychological Science*, 14, 91-99.

Yoshida, H., & Smith, L. B. (2005). Linguistic cues enhance the learning of perceptual cues. *Psychological Science*, 16, 90-95.