Writing a Research Abstract

The written abstract is used in making selections for presentations at scientific meetings. Writing a good abstract is a formidable undertaking and many novice researchers wonder how it is possible to condense months of work into 300 to 400 words. Nevertheless, creating a well-written abstract is a skill that can be learned and mastering the skill will increase the probability that your research will be selected for presentation.

The first rule of writing abstracts is to know the rules. Organizers of scientific meetings set explicit limits on the length abstracts.

Authors must pay close attention to the published details of the meeting including deadlines and suggested format. Since reviewers have many abstracts to read and rank; those that don't conform to the stated rules are simply discarded.

The scientific abstract is usually divided into five unique sections: Title and Author Information, Introduction, Methods, Results, and Conclusions. The following paragraphs summarize what is expected in each of these sections.

Title and Author Information: The title should summarize the abstract and convince the reviewers that the topic is important, relevant, and innovative. To create a winning title, write out 6 to 10 key words found in the abstract and string them into various sentences. Once you have a sentence that adequately conveys the meaning of the work, try to condense the title yet still convey the essential message. Some organizations require a special format for the title, such as all uppercase letters, all bolded, or in italics. Be sure to check the instructions.
Following the title, the names of all authors and their institutional affiliations are listed. It is assumed the first author listed will make the oral presentation. Determine if the first author needs to meet any eligibility requirements to make the presentation. For example, the first author may need to be a member of the professional society sponsoring the research meeting. This information is always included with the abstract instructions.

Introduction: This usually consists of several sentences outlining the question addressed by the research. Make the first sentence of the introduction as interesting and dramatic as possible. For example, "100,000 people each year die of…" is more interesting than "An important cause of mortality is…" If space permits, provide a concise review of what is known about the problem addressed by the research, what remains unknown, and how your research project fills the knowledge gaps. The final sentence of the introduction describes the purpose of the study or the study's a priori hypothesis.
Methods: This is the most difficult section of the abstract to write. It must be scaled down sufficiently to allow the entire abstract to fit into the box, but at the same time it must be detailed enough to judge the validity of the work. For most clinical research abstracts, the following areas are specifically mentioned: research design; research setting; number of patients enrolled in the study and how they were selected; a description of the intervention (if appropriate); and a listing of the outcome variables and how they were measured. Finally, the statistical methods used to analyze the data are described.
Results: This section begins with a description of the subjects that were included and excluded from the study. For those excluded, provide the reason for their exclusion. Next, list the frequencies of the most important outcome variables. If possible, present comparisons of the outcome variables between various

subgroups within the study (treated vs. untreated, young vs. old, male vs. female, and so forth). This type of data can be efficiently presented in a table, which is an excellent use of space. But before doing this, check the rules to see if tables can be used in the abstract. Numerical results should include standard deviations or 95% confidence limits and the level of statistical significance. If the results are not statistically significant, present the power of your study (beta-error rate) to detect a difference.
Conclusion: State concisely what can be concluded and its implications. The conclusions must be supported by the data presented in the abstract; never present unsubstantiated personal opinion. If there is room, address the generalizability of the results to populations other than that studied and the weaknesses of the study.
Research literature has a special language that concisely and precisely communicates meaning to other researches. Abstracts should contain this special language and be used appropriately. See The Glossary of commonly used research terms.
Avoid the use of medical jargon and excessive reliance on abbreviations. Limit abbreviations to no more than three and favor commonly used abbreviations. Always spell out the abbreviations the first time they are mentioned unless they are commonly recognized (e.g., CBC).

Although short in length, a good abstract typically takes several days to write. Take this into account when budgeting your time. Seek the help of an experienced mentor. Share the abstract with your mentor and make revisions based upon the feedback. Allow others to read your draft for clarity and to check for spelling and grammatical mistakes. Reading the abstract orally is an excellent way to catch grammatical errors and word omissions. Use theScientific Abstract Checklist to assist your completion of the task. Finally, an example of an abstract previously accepted for presentation at the ACP Resident Research Competition is attached for your review.

How to write a good abstract for a scientific paper or conference presentation

Abstract

Go to:

INTRODUCTION

This paper is the third in a series on manuscript writing skills, published in the *Indian Journal of Psychiatry*. Earlier articles offered suggestions on how to write a good case report,[1] and how to read, write, or review a paper on randomized controlled trials.[2,3] The present paper examines how authors may write a good abstract when preparing their manuscript for a scientific journal or conference presentation. Although the primary target of this paper is the young researcher, it is likely that authors with all levels of experience will find at least a few ideas that may be useful in their future efforts.

The abstract of a paper is the only part of the paper that is published in conference proceedings. The abstract is the only part of the paper that a potential referee sees when he is invited by an

editor to review a manuscript. The abstract is the only part of the paper that readers see when they search through electronic databases such as PubMed. Finally, most readers will acknowledge, with a chuckle, that when they leaf through the hard copy of a journal, they look at only the titles of the contained papers. If a title interests them, they glance through the abstract of that paper. Only a dedicated reader will peruse the contents of the paper, and then, most often only the introduction and discussion sections. Only a reader with a very specific interest in the subject of the paper, and a need to understand it thoroughly, will read the entire paper.

Thus, for the vast majority of readers, the paper does not exist beyond its abstract. For the referees, and the few readers who wish to read beyond the abstract, the abstract sets the tone for the rest of the paper. It is therefore the duty of the author to ensure that the abstract is properly representative of the entire paper. For this, the abstract must have some general qualities. These are listed in Table 1.

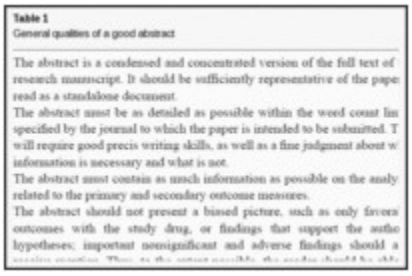
Table 1
General qualities of a good abstract

The abstract is a condensed and concentrated version of the full text of
research manuscript. It should be sufficiently representative of the pape
read as a standalone document.
The abstract must be as detailed as possible within the word count lim
specified by the journal to which the paper is intended to be submitted. T
will require good precis writing skills, as well as a fine judgment about w
information is necessary and what is not.
The abstract must contain as much information as possible on the study
related to the primary and secondary outcome measures.
The abstract should not present a biased picture, such as only favora
outcomes with the study drug, or findings that support the autho
hypotheses; important nonsignificant and adverse findings should a

Table 1

General qualities of a good abstract

Go to:

SECTIONS OF AN ABSTRACT

Although some journals still publish abstracts that are written as free-flowing paragraphs, most journals require abstracts to conform to a formal structure within a word count of, usually, 200–250 words. The usual sections defined in a structured abstract are the Background, Methods, Results, and Conclusions; other headings with similar meanings may be used (eg, Introduction in place of Background or Findings in place of Results). Some journals include additional sections, such as Objectives (between Background and Methods) and Limitations (at the end of the abstract). In the rest of this paper, issues related to the contents of each section will be examined in turn.

Background

This section should be the shortest part of the abstract and should very briefly outline the following information:

1. What is already known about the subject, related to the paper in question

2. What is not known about the subject and hence what the study intended to examine (or what the paper seeks to present)

In most cases, the background can be framed in just 2–3 sentences, with each sentence describing a different aspect of the information referred to above; sometimes, even a single sentence may suffice. The purpose of the background, as the word itself indicates, is to provide the reader with a background to the study, and hence to smoothly lead into a description of the methods employed in the investigation.

Some authors publish papers the abstracts of which contain a lengthy background section. There are some situations, perhaps, where this may be justified. In most cases, however, a longer background section means that less space remains for the presentation of the results. This is unfortunate because the reader is interested in the paper because of its findings, and not because of its background.

A wide variety of acceptably composed backgrounds is provided in Table 2; most of these have been adapted from actual papers.[4–9] Readers may wish to compare the content in Table 2 with the original abstracts to see how the adaptations possibly improve on the originals. Note that, in the interest of brevity, unnecessary content is avoided. For instance, in Example 1 there is no need to state "The antidepressant efficacy of desvenlafaxine (DV), *a dual-acting antidepressant drug*, has been established…" (the unnecessary content is italicized).

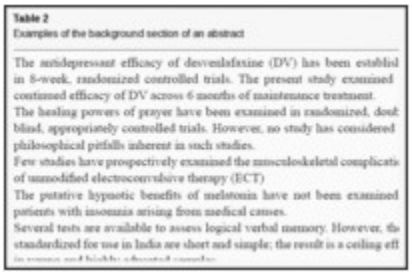
Table 2
Examples of the background section of an abstract

The antidepressant efficacy of desvenlafaxine (DV) has been establis
in 8-week, randomized controlled trials. The present study examined
continued efficacy of DV across 6 months of maintenance treatment.
The healing powers of prayer have been examined in randomized, doub
blind, appropriately controlled trials. However, no study has considered
philosophical pitfalls inherent in such studies.
Few studies have prospectively examined the musculoskeletal complicatio
of unmodified electroconvulsive therapy (ECT)
The putative hypnotic benefits of melatonin have not been examined
patients with insomnia arising from medical causes.
Several tests are available to assess logical verbal memory. However, th
standardized for use in India are short and simple; the result is a ceiling eff

Table 2

Examples of the background section of an abstract

Methods

The methods section is usually the second-longest section in the abstract. It should contain enough information to enable the reader to understand what was done, and how. Table 3 lists important questions to which the methods section should provide brief answers.

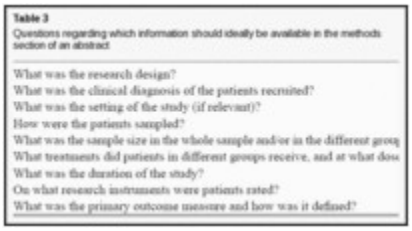

Table 3

Questions regarding which information should ideally be available in the methods section of an abstract

What was the research design?
What was the clinical diagnosis of the patients recruited?
What was the setting of the study (if relevant)?
How were the patients sampled?
What was the sample size in the whole sample and/or in the different groups?
What treatments did patients in different groups receive, and at what dose?
What was the duration of the study?
On what research instruments were patients rated?
What was the primary outcome measure and how was it defined?

Carelessly written methods sections lack information about important issues such as sample size, numbers of patients in different groups, doses of medications, and duration of the study. Readers have only to flip through the pages of a randomly selected journal to realize how common such carelessness is.

Table 4 presents examples of the contents of accept-ably written methods sections, modified from actual publications.[10,11] Readers are invited to take special note of the first sentence of each example in Table 4; each is packed with detail, illustrating how to convey the maximum quantity of information with maximum economy of word count.

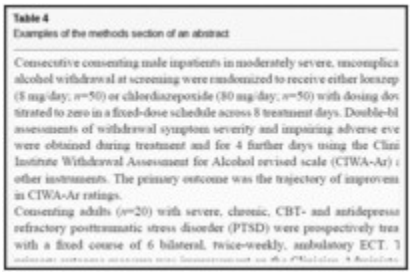

Table 4

Examples of the methods section of an abstract

Consecutive consenting male inpatients in moderately severe, uncomplica alcohol withdrawal at screening were randomized to receive either lorazep (5 mg/day; n=50) or chlordiazepoxide (30 mg/day; n=50) with dosing dov titrated to zero in a fixed-dose schedule across 8 treatment days. Double-bl assessments of withdrawal symptom severity and impairing adverse eve were obtained during treatment and for 4 further days using the Clini Institute Withdrawal Assessment for Alcohol revised scale (CIWA-Ar) a other instruments. The primary outcome was the trajectory of improvem in CIWA-Ar ratings.
Consenting adults (n=20) with severe, chronic, CBT- and antidepress refractory posttraumatic stress disorder (PTSD) were prospectively trea with a fixed course of 6 bilateral, twice-weekly, ambulatory ECT. T

Table 4

Examples of the methods section of an abstract

Results

The results section is the most important part of the abstract and nothing should compromise its range and quality. This is because readers who peruse an abstract do so to learn about the findings of the study. The results section should therefore be the longest part of the abstract and

should contain as much detail about the findings as the journal word count permits. For example, it is bad writing to state “Response rates differed significantly between diabetic and nondiabetic patients.” A better sentence is “The response rate was higher in nondiabetic than in diabetic patients (49% vs 30%, respectively; $P<0.01$).”

Important information that the results should present is indicated in Table 5. Examples of acceptably written abstracts are presented in Table 6; one of these has been modified from an actual publication.[11] Note that the first example is rather narrative in style, whereas the second example is packed with data.

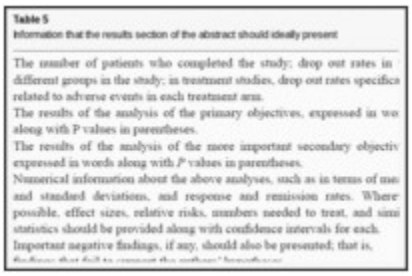

Table 5

Information that the results section of the abstract should ideally present

The number of patients who completed the study; drop out rates in different groups in the study; in treatment studies, drop out rates specifica related to adverse events in each treatment arm.
The results of the analysis of the primary objectives, expressed in wo along with P values in parentheses.
The results of the analysis of the more important secondary objectiv expressed in words along with *P* values in parentheses.
Numerical information about the above analyses, such as in terms of me and standard deviations, and response and remission rates. Where possible, effect sizes, relative risks, numbers needed to treat, and simi statistics should be provided along with confidence intervals for each.
Important negative findings, if any, should also be presented; that is,

Table 5

Information that the results section of the abstract should ideally present

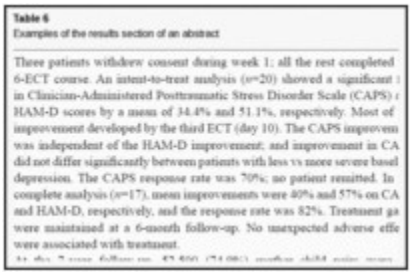

Table 6

Examples of the results section of an abstract

Three patients withdrew consent during week 1; all the rest completed 6-ECT course. An intent-to-treat analysis (*n*=20) showed a significant i in Clinician-Administered Posttraumatic Stress Disorder Scale (CAPS) s HAM-D scores by a mean of 34.4% and 51.1%, respectively. Most of improvement developed by the third ECT (day 10). The CAPS improvem was independent of the HAM-D improvement; and improvement in CA did not differ significantly between patients with less vs more severe basel depression. The CAPS response rate was 70%; no patient remitted. In complete analysis (*n*=17), mean improvements were 40% and 57% on CA and HAM-D, respectively, and the response rate was 82%. Treatment ga were maintained at a 6-month follow-up. No unexpected adverse effe were associated with treatment.

Table 6

Examples of the results section of an abstract

Go to:

CONCLUSIONS

This section should contain the most important take-home message of the study, expressed in a few precisely worded sentences. Usually, the finding highlighted here relates to the primary outcome measure; however, other important or unexpected findings should also be mentioned. It is also customary, but not essential, for the authors to express an opinion about the theoretical or practical implications of the findings, or the importance of their findings for the field. Thus, the conclusions may contain three elements:

1. The primary take-home message
2. The additional findings of importance
3. The perspective

Despite its necessary brevity, this section has the most impact on the average reader because readers generally trust authors and take their assertions at face value. For this reason, the conclusions should also be scrupulously honest; and authors should not claim more than their data demonstrate. Hypothetical examples of the conclusions section of an abstract are presented in Table 7.

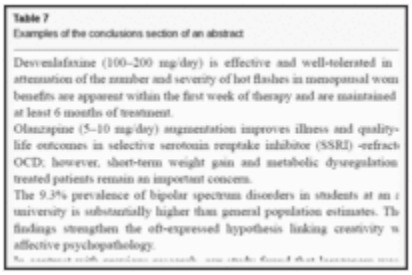

Table 7

Examples of the conclusions section of an abstract

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MISCELLANEOUS OBSERVATIONS

Citation of references anywhere within an abstract is almost invariably inappropriate. Other examples of unnecessary content in an abstract are listed in Table 8.

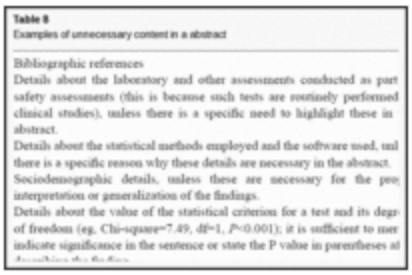

Table 8

Examples of unnecessary content in a abstract

Bibliographic references

Details about the laboratory and other assessments conducted as part safety assessments (this is because such tests are routinely performed clinical studies), unless there is a specific need to highlight these in abstract.

Details about the statistical methods employed and the software used, unl there is a specific reason why these details are necessary in the abstract.

Sociodemographic details, unless these are necessary for the pro interpretation or generalization of the findings.

Details about the value of the statistical criterion for a test and its degr of freedom (eg, Chi-square=7.49, df=1, $P<0.001$); it is sufficient to mer indicate significance in the sentence or state the P value in parentheses at

Examples of unnecessary content in a abstract

It goes without saying that whatever is present in the abstract must also be present in the text. Likewise, whatever errors should not be made in the text should not appear in the abstract (eg, mistaking association for causality).

As already mentioned, the abstract is the only part of the paper that the vast majority of readers see. Therefore, it is critically important for authors to ensure that their enthusiasm or bias does not deceive the reader; unjustified speculations could be even more harmful. Misleading readers could harm the cause of science and have an adverse impact on patient care.[12] A recent study, [13] for example, concluded that venlafaxine use during the second trimester of pregnancy may increase the risk of neonates born small for gestational age. However, nowhere in the abstract did the authors mention that these conclusions were based on just 5 cases and 12 controls out of the total sample of 126 cases and 806 controls. There were several other serious limitations that rendered the authors' conclusions tentative, at best; yet, nowhere in the abstract were these other limitations expressed.

As a parting note: Most journals provide clear instructions to authors on the formatting and contents of different parts of the manuscript. These instructions often include details on what the sections of an abstract should contain. Authors should tailor their abstracts to the specific requirements of the journal to which they plan to submit their manuscript. It could also be an excellent idea to model the abstract of the paper, sentence for sentence, on the abstract of an important paper on a similar subject and with similar methodology, published in the same journal for which the manuscript is slated.

Go to:

Footnotes

Source of Support: Nil

Conflict of Interest: None declared.

Writing Tips: How To Write an Abstract

How To Write an Abstract/Prospectus

Abstract vs. Research Proposal (Plan) or Prospectus

An abstract usually acts as a summary of work already completed and is used by prospective readers to decide whether or not to read the entire text. Abstracts are usually found immediately preceding a research document (such as a thesis or dissertation), and/or in professional journals and abstract indexes (both online and in hard copy). An abstract should represent as much as is possible the quantitative and qualitative information in the document, and also reflect its reasoning. Social science disciplines that use APA (American Psychological Association) style require abstracts to precede the larger paper (see the most recent edition of the APA style guide, Section 1.07, for more information), whereas humanities disciplines

often do not require abstracts. Conference abstracts are used to propose paper topics/panel sessions at professional conferences in your disciplines and require slightly different rhetorical methods (see summary on conference abstracts below).

A research proposal (plan) or prospectus usually acts as the first step in producing a thesis/dissertation or a major research project. Its intent is to convince a supervisor or academic committee that your topic and approach are sound, so that you can gain approval to proceed with the actual research and also often so you can gain funding for that research. As well as indicating your plan of action, a prospectus or academic proposal should show your theoretical positioning and your relationship to past work in your research area. It is important that you spend some time thinking and drafting your prospectus/research proposal or abstract since the quality of these documents is often solely responsible for whether or not your paper is accepted to a conference, whether or not your research project is approved, and/or whether or not you receive funding for a research project. Your abstract or prospectus/research proposal is literally a "first impression" to your reader/audience, one that you want to make positively. Thus, you should consider writing more than one draft and beginning your drafting process early; a Writing Center visit, is, of course, always advisable!

Abstracts

Typically, an informative abstract answers these questions in 100-250 words:

- *Why did you do this study or project?*
- *What did you do and how?*
- *What did you find?*
- *What do your findings mean?*

If your paper is about a new method or apparatus, the last two questions might be changed to:

- *What are the advantages (of the method or apparatus)?*
- *How well does it work?*

Some points to keep in mind while writing abstracts:

- While drafting your abstract: look over your subject to see what disciplinary assumptions are challenged; question the significance of your ideas; emphasize the important results and address limitations in a realistic manner.
- An abstract will nearly always be read along with the title, so do not repeat or rephrase your title. It will likely be read without the rest of the document, however, so make it complete enough to stand on its own.
- Your readers expect you to summarize your conclusions in an abstract, as well as your purposes, methods and main findings. Emphasize the different points of your study in proportion to the emphasis they receive in the body of the document.
- *DO NOT refer in the abstract to information that is not in the document.* This is very important and is a little like "truth in advertising." You do not want to give your reader the impression that your study covers information it does not actually contain.
- Avoid using the first person "I" or "we." In addition, whenever possible, choose active verbs instead of passive ones (ex: use "*the study tested*" instead of "*it was tested by the study*" or "*I tested in the study*").
- Avoid, if possible, using trade names, acronyms, abbreviations or symbols in your abstract. You would have to explain these names which would take up valuable room/words.
- Use non-evaluative language in your abstract; *report* instead of *comment* upon your findings.
- Use key words from the document to help indexers more accurately index your document for future research.
- Ease your readers/audience into your topic. Or, in other words, be sensitive to the needs and knowledge of your audience. What might seem perfectly obvious to you after working on a longer writing or research project will often be brand-new to your audience.
- Don't procrastinate! It is best to write the abstract immediately after you finish your project while the ideas are still fresh in your mind.
- **Helpful hint:** Some writing instructors and experienced writers suggest writing an abstract for *all* of your writing projects since it makes you focus on what is important in your paper/project. It also provides a powerful way of reevaluating your logic and in defining your purpose. An abstract can be extremely helpful in your writing process if you are stuck or blocked.

Remember, a well written abstract often can ensure wide publication since many computerized databases and printed indexes reprint abstracts so scholars can keep up with each other's work, and associations and corporations often publish abstracts in given fields and mail them to appropriate researchers and scholars, etc. Thus, if you want to ensure that your work has an impact on your field, you should work as hard as possible in presenting a precise and engaging abstract.

A conference abstract is an abstract that you submit for consideration to present a paper at a professional conference. It is usually much longer than a summary abstract and functions independently from the paper

it is based on (since the conference review committee will see it and not your actual paper). Thus, your primary audience for the conference abstract is the conference review committee. The conference participants -- to whom you will actually deliver your paper -- are your secondary audience. In addition to impressing the conference reviewing committee, your purpose in writing a conference abstract is to create a "research space" from which to write/present and to appeal to as large an audience as possible.

Research Proposal (Plan) or Prospectus

An academic research proposal or prospectus is expected to contain these elements:

- A rationale for the choice of topic, showing why it is important or useful within the concerns of the discipline in which you are writing. It is sensible also to indicate the limitations of your aims. In other words, don't promise what you can't possibly deliver.
- A review of existing published work ("the literature") that relates to a topic. Here you need to tell how your proposed work will build on existing studies and yet explore new territory.
- An outline of your intended approach or methodology (with comparisons to existing published work), perhaps including costs, resources needed, and a timeline of when you hope to get things done

Particular disciplines have different ways of organizing a research proposal or prospectus. As such, it is wise to ask within your department what the standard guidelines are in organizing your research proposal/prospectus. Research proposals/prospectuses are often longer than abstracts (up to 500 words). Often it is helpful to begin with a research question that you would like to investigate/attempt to answer. Other general tips in putting together a research proposal/prospectus include:

- Start with why your idea is worth doing (its contribution to the field), then fill in how you will address your idea (the technicalities about the topic and method).
- Give enough detail to establish the feasibility of your proposal, but not so much as to bore your reader.
- Show your ability to deal with possible problems or changes in focus (which will often happen in a longer research project or thesis/dissertation).
- ***Show confidence and eagerness by using the first person "I," as well as using active verbs, concise style and positive phrasing.

Some other tips to get you started

- Look closely at departmental specifications (about timing, scope, length, readers, etc.). Remember, standards for abstracts, research proposals (plans) or prospectuses vary widely from discipline to discipline, journal to journal, conference to conference, and rhetorical situation to rhetorical situation.
- Ask other students (undergraduate as well as graduate) in your department about their experiences with this type of writing; look at past abstracts, research proposals (plans) and prospectuses for examples.
- Try out your ideas with as wide an audience as possible, especially with your supervisor and/or committee members (informal discussions, drafts, preliminary meetings, presentations at colloquia, etc.). Or, of course, use the services of the Writing Center as an additional audience!
- ***Show why your research idea is interesting within your research field by discussion of what other scholars/writers have done and not done with your topic in your field.
- ***Show that you can carry out your project by sketching your methodology.
- Limit your promises/scope: exclude topics and methods that you will not address and outline those that you will use.
- Gain your reader's interest early by using active language and enthusiasm in your topic!
- Don't confuse verb tenses: use present tense to describe results with continuing applicability or conclusions drawn; use the past tense to describe specific variables manipulated or tests applied; and future tense to project research and predict findings. Avoid "boilerplate sentences" which take up room and provide no real information (ex: "Policy implications are discussed" or "It is concluded that," etc.).
- ALWAYS USE FULL SENTENCES and avoid negatives like "cannot," "never," etc. Avoid abbreviations, jargon, symbols and other language shortcuts that might lead to confusion.
- Above all, don't procrastinate!!! Delay just isolates you and drains your energies.