U-2013

Guía de trabajo. Área de Inglés IBCO

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U-2013

INTRODUCCIÓN

Durante el desarrollo de la asignatura Investigación Biopatológica, Clínica y Operativa (IBCO) se hace necesario que el estudiante lea una cantidad considerable de artículos científicos en inglés para la construcción de su proyecto final de investigación. Para ello, desde el área de inglés, se ejercitarán estrategias de lectura de textos científicos con el propósito de extraer información que pueda ser incorporada en un trabajo de investigación científica.

Los contenidos se desarrollarán de forma progresiva y se seguirá lo estipulado en el programa vigente. La evaluación será continua y se basará principalmente en el trabajo en aula, por lo que la asistencia se hace indispensable. Habrá actividades que se realizarán de acuerdo al ritmo y necesidades de los estudiantes. Igualmente, se dispondrá de sesiones no presenciales planificadas para facilitar el logro de los objetivos.

Dado que se harán diversas actividades prácticas en el aula *se recomienda tener una carpeta en la cual se archive todo el material de trabajo sugerido en esta guía.* De esta forma podrán hacer uso del mismo en el momento que se les solicite, lo cual puede ser en cualquier clase. Cada estudiante asume la responsabilidad de realizar las actividades de investigación asignadas para alcanzar el logro de los objetivos. Por lo tanto se asume que el estudiante ha investigado y no se procederá a detener la clase para desarrollar aspectos que deban traerse preparados.

Durante las evaluaciones cada estudiante debe tener su propio material de apoyo, y en el caso de trabajo en pareja o grupo cada grupo funciona como una unidad con sus propios materiales. No se permitirá el intercambio de éstos durante las evaluaciones; en este sentido, cada estudiante o grupo asume la responsabilidad de traerlos a clase y a las evaluaciones.

UNIDAD I

Objetivo 1: Desarrollar estrategias de lectura para la selección de información específica en inglés.

Contenido

I. Skimming y Scanning.

Previo a la clase

1. Leer el material sobre Scanning y Skimming para hacer la discusión en el aula.

En clase

1. Discutir acerca de las estrategias de Scanning y Skimming y su pertinencia en el ámbito de la investigación científica.
2. Discutir acerca de la forma adecuada de usar ambas estrategias.

Luego de clase

1. Ejercite las estrategias estudiadas con textos de su interés, tanto en su lengua materna como en inglés.

READING AND STUDY SKILLS LAB

SOS

Seek Optimum Skills

SKIMMING AND SCANNING

Skimming and scanning are two specific speed-reading techniques, which enable you to cover a vast amount of material very rapidly. These techniques are similar in process but different in purpose. Quickly "looking over" an article is neither skimming nor scanning. Both require specific steps to be followed.

I. **SKIMMING** is a method of rapidly moving the eyes over text with the purpose of getting only the main ideas and a general overview of the content.

A. Skimming is useful in three different situations.

- Pre-reading--Skimming is more thorough than simple previewing and can give a more accurate picture of text to be read later.
- Reviewing--Skimming is useful for reviewing text already read.
- Reading--Skimming is most often used for quickly reading material that, for any number of reasons, does not need more detailed attention.

B. Steps in skimming an article

- Read the title--it is the shortest possible summary of the content.
- Read the introduction or lead-in paragraph.
- Read the first paragraph completely.
- If there are subheadings, read each one, looking for relationships among them.
- Read the first sentence of each remaining paragraph.
  - a. The main idea of most paragraphs appears in the first sentence.
  - b. If the author's pattern is to begin with a question or anecdote, you may find the last sentence more valuable.

6. Dip into the text looking for:
   - a. Clue words that answer who, what, when, why, how
   - b. Proper nouns
   - c. Unusual words, especially if capitalized
   - d. Enumerations
   - e. Qualifying adjectives (best, worst, most, etc.)
   - f. Typographical cues--italics, boldface, underlining, asterisks, etc.
7. Read the final paragraph completely.

C. Mastering the art of skimming effectively requires that you use it as frequently as possible.

D. Skimming can usually be accomplished at about 1000 words per minute.

II. **SCANNING** rapidly covers a great deal of material in order to locate a specific fact or piece of information.

A. Scanning is very useful for finding a specific name, date, statistic, or fact without reading the entire article.

B. Steps in scanning an article.
   - Keep in mind at all times what it is you are searching for. If you hold the image of the word or idea clearly in mind, it is likely to appear more clearly than the surrounding words.
   - Anticipate in what form the information is likely to appear--numbers, proper nouns, etc.
   - Analyze the organization of the content before starting to scan.
     a. If material is familiar or fairly brief, you may be able to scan the entire article in a single search.
     b. If the material is lengthy or difficult, a preliminary skimming may be necessary to determine which part of the article to scan.
   - Let your eyes run rapidly over several lines of print at a time.
   - When you find the sentence that has the information you seek, read the entire sentence.

C. In scanning, you must be willing to skip over large sections of text without reading or understanding them.

D. Scanning can be done at 1500 or more words per minute.

UNIDAD I (continuación)

Objetivo 1: Desarrollar estrategias de lectura para la selección de información específica en inglés.

Contenido

II. Estructura y caracterización de los diferentes textos científicos en inglés.

Previo a la clase:

1. Investigue sobre la estructura de un caso clínico, un artículo de revisión y uno basado en la estructura IMRyD (IMRaD).
2. Lea el artículo "Contributing to research: the basic elements of a scientific manuscript" (Kurmis, 2003).

En clase

1. Discutir los conceptos de macroestructura y microestructura.
2. Estudiar la importancia de conocer la macroestructura de los textos en el ámbito de la investigación científica.
3. Discutir acerca de la estructura de los diferentes artículos científicos que se producen en el ámbito de la investigación odontológica.

Luego de clase

1. Ejercitar lo estudiado, revisando algunos artículos de su interés (en inglés) para identificar su estructura.

Ejercicio 1 (evaluación continua)

Parte 1 de la actividad. Seleccionar cuatro artículos relacionados con un tema de investigación de su interés para preparar una discusión sobre el mismo. Llene la siguiente ficha para cada uno de los artículos seleccionados (el llenado se hace en español)

Parte 2 de la actividad. Extraer información específica de los artículos durante la actividad de clase, para armar su tema de discusión.

Parte 3 de la actividad. Escribir una discusión breve basada en lo discutido en éstos. En la presentación escrita deberá hacer alusión a los hallazgos de otros investigadores y no sólo a aspectos teóricos. Una vez finalizada su discusión escrita, deberá presentar bajo el subtítulo: “Estrategias de lectura utilizadas” un resumen sobre las estrategias utilizadas para la lectura de los textos y la selección de la información. Recuerde que en este nivel, se evalúa la correcta redacción con especial énfasis en la cohesión y coherencia.

Kings County Office of Education
Tim Bowers
County Superintendent of Schools

STAGES OF INVESTIGATION – "Reading like a Scientist"

STAGE A – *CONTEXT* *(Inferring, Questioning)*				
Who is the author?	What scientific expertise does the author have?		What areas of scientific research form the backdrop for the text?	What do I predict will be the author's message?
		Resource:		

STAGE B – *TEXT* *(Analyzing, Understanding)*	
What scientific questions are raised by this text?	What scientific dilemma is related to the text? (highlight or cite evidence from text)

STAGE C – *IMPERSONAL SUBTEXT* *(Inferring, Evaluating)*	
What scientific question or dilemma should be explored further? How could this question be researched further?	Describe a *thought experiment* (writing a thought about a possible experiment design) that could be developed to answer the question or resolve the dilemma.

STAGE D – *PERSONAL SUBTEXT* *(Synthesizing, Judging)*	
How is the answer to this scientific question likely to change my life or the lives of others?	How might the resolution of this scientific dilemma impact my life or the lives of others?

After Stages of Investigation and Debrief:	
My overall thinking is:	Based on this evidence:

**Adapted from Disciplinary Literacy: Refining Deep Understanding and Leadership for 21st-Century Demands (2011) by Thomasina Piercy and William Piercy.*
*****Bold Text*** *indicates differentiated language for English Learners and Special Populations*

Entregar en la fecha y hora indicada por la profesora:

- Fichas de la parte 1 de la actividad (llenas)
- Resumen escrito en español del tema que desarrolló en función de los artículos consultados (Cuidar el uso adecuado del sistema de referencias seleccionado).
- Copia de los artículos consultados (subrayados o con las notas que hayan hecho para extraer la información)

Importante: Entregar *en carpeta Manila tamaño carta, con gancho y debidamente identificada con una etiqueta que señale apellidos, nombres y sección de cada responsable (ver ejemplo).* El contenido de la carpeta debe estar en el orden indicado anteriormente. No se reciben trabajos que no cumplan con los requisitos señalados. Esta actividad puede hacer individual o en pareja.

La etiqueta deberá contener: Apellidos y Nombres de los estudiantes (separados por una coma). Sección (para cada uno). Identificación de la Actividad y fecha de la misma.

Ejemplo de etiqueta para la carpeta manila:

Perdomo P, Manuel R. Sección 03

Flores P, Andy. Sección 03

Actividad Evaluada 1.

Enero, 2014

UNIDAD I (continuación)

Objetivo 1: Desarrollar estrategias de lectura para la selección de información específica en inglés.

Contenidos

II.1 Elementos lingüísticos propios de artículos de investigación en inglés.

Previo a la clase

1. Revise nuevamente el artículo titulado: *Contributing to research: the basic elements of a scientific manuscript* (Kurmis, 2003). El mismo será la base para la discusión del contenido de este objetivo y para poder realizar las diferentes actividades del mismo.

2. Traer algunos artículos científicos en inglés que está usando para hacer su planteamiento de problema (al menos tres). Puede usar artículos usados en la evaluación 1.

En clase

1. Revisar la estructura de los artículos relacionados con su investigación que trajo a clase y discutir acerca de su tipo.
2. Discutir el uso de la estructura del texto en la lectura de material científico en lengua extranjera.
3. ¿Qué estrategias de lectura utilizaría para cada uno de esos artículos? Presente sus respuestas para discusión.

Luego de clase

Leer el material "*Reading strategies"*. En la siguiente clase se hará una discusión basada en dicho material.

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THE COLLEGE OF RADIOGRAPHERS

Contributing to research: the basic elements of a scientific manuscript

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The changing focus within medical and allied health disciplines towards evidence-based practice has resulted in an increasing acceptance of research and professional researchers. Despite the shift towards tertiary degree-based training for medical imaging and allied specialty streams, with many teaching institutions now incorporating compulsory research components into their final year curriculum, the level of active involvement in research among graduates remains low. In addition to this, many of those who completed their training before the introduction of university degree courses have had little or no exposure to hands-on research.

While not overtly difficult, the process of 'writing up' the findings of a research endeavour for presentation to peers can often seem a somewhat daunting task, especially for novice researchers. The structure of a scientific manuscript however follows a relatively basic and universally accepted pattern, adherence to which can greatly simplify the writing process.

To contribute to a wider understanding of research, the purpose of this paper is to provide an overview of the basic elements of a scientific research paper for journal publication. The outline provided, while not intended to be a recipe for manuscript construction, will provide a fundamental framework to assist student, junior or inexperienced researchers in their writings.

PREFACE

With the change to university-based degree training models for educating medical radiation and allied professionals the fundamental skill base of individuals in our field is evolving [1]. Courses now focus on much more than simply the process of generating radiographic images. Graduates are assumed to have a solid understanding of anatomy and physiology, know how to care for and effectively communicate with patients, how to operate complex computing and imaging equipment, as well as knowing the legal and medico-ethical conditions by which we are bound [2]. In addition, many courses now incorporate a research component that exposes students to basic research concepts and may even involve an active research endeavour [3]. Post-graduate studies are becoming increasingly more popular as individual institutions establish their own higher degree programs.

Despite this, research within our profession is not currently being carried out or actively participated in by the majority [1, 3]. Few professional members have a solid understanding of the sequential steps involved in effectively carrying out a research project [1]. One essential component in the research cascade (arguably the most important) is the process of writing up the results so that we may share with others what our work has shown us (what benefit is information that is not shared?) [1, 4, 5].

While the completion of a research endeavour can be (and often is) a difficult and demanding task,

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writing up the findings of the work in a form that can be published for others to read (and understand) presents an entirely new challenge by itself [6, 7]. This initially may seem like a simple and easy step. However, having worked hard to complete the project work, any honours year or higher degree graduate will tell you that, if not approached correctly, manuscript writing can, unnecessarily, be one of the most challenging stages of research.

While this paper is not a 'cut and paste' template for manuscript writing and the method presented should not be considered the 'only' way to construct a paper (there are in fact many other valid and accepted formats for presenting research in scientific journals other than the one detailed here), it does provide a solid outline, overview and discussion of the key elements of one of the most widely used styles for research presentation within medical and allied health periodical publications. It is hoped that this paper will prove to be of some benefit in guiding inexperienced or student researchers, or those with no formal training in research methods, to appropriately structure scientific manuscripts.

The following sections initially introduce some helpful 'rules of thumb' in putting together and editing a research paper and then describe the basic elements which form one. For those wishing to gain an even more detailed understanding of this skill, there are several easy to read text books available [8—10].

GENERAL RULES

Within a basic accepted framework, a research paper represents an opportunity for authors to express the results, findings and outcomes of their work in an individual manner [11]. The style of writing and presentation varies enormously from paper to paper [11] and beyond the individuality of the author(s) and the discipline itself, is heavily influenced by the type of work reported, the journal of publication and the intended target audience. Despite this diversity, there are many fundamental rules that all good scientific writers follow including adherence to brevity, concision, and logical structure and flow [4, 5, 7]. Understanding and applying these rules can be useful in helping inexperienced writers improve the quality of their work. Listing every criterion of 'good writing' is well beyond the scope of this paper but the following paragraphs presents some key ideas to keep in mind when writing.

Basic writing tips

All work should be presented with a progressive, logical flow so others can follow your ideas, methods and understand how your conclusions were rationally drawn [7]. It is important to cater not just for experts in the field about which you write but also for general readers with basic or little knowledge of your topic area [4, 5, 12]. Technical terms should be defined, and jargon [4] and 'flowery' non-scientific writing avoided.

Avoid excessive repetition of words or terms (are there appropriate synonyms for substitution?). Be careful also of overuse of complicated or scientific words and terms [4], they can make reading difficult for members of the non-expert audience. Introduced abbreviations may be appropriate in describing highly technical work, allowing readers to follow the writing with little interruption to flow.

Ensure consistency of tense throughout the paper [4]. Usually the past tense is most appropriate (i.e. These experiments *were* performed…) after all, you have finished the research, so the majority of the research paper should be a past tense reflection of work already done.

And finally the golden rule of all writing (no matter what the topic area)—ensure the correct use of grammar and spelling [1, 4, 7]. Nothing frustrates editors and reviewers more than glaring basic textual errors. On this topic, be aware that electronic spelling and grammar checkers are not infallible [4]. The same word may take several forms, all correct, but spelt differently (there, their, they're etc.). Your spell checker does not have the ability to distinguish between different forms of the same word. Always proofread your own work prior to submission (having someone else review your work can also be very helpful) [1].

BASIC MANUSCRIPT STRUCTURE

Most scientific journals follow the basic manuscript format of 'introduction', 'methods', 'results', 'discussion' and 'conclusions' (which may arise from the discussion or be presented as a separate section) [4, 11]. Several other supplementary sections including 'acknowledgments', a 'reference list' and a series of 'figures and tables' also contribute to the formation of the complete paper. It is important to note that while this list of sections are common to a 'standard' paper, they may not necessarily be appropriate in all forms of scientific writing. Individual manuscripts are usually preceded by an 'abstract' or overview statement. The size (word length) of each section varies from paper to paper, although some journals may set specific limits for individual sections. The length of the paper itself (excluding references) is generally between 3000 and 5000 words [11], although some may be justifiably more (i.e. review articles) or less (i.e. short technical notes).

Table 1 provides a summary of the sections contributing to a 'standard' scientific manuscript. The role and purpose of these sections are now explored and described in more detail.

Introduction

Being the first component of the paper, this section should explain the justification for the study. It should discuss relevant previous work in the area [4] (if any), which will require the author(s) to have completed a thorough literature search [12]. The majority of references to earlier work are generally made in this section. The introduction places the current work in perspective [4], states the purpose for the study and what is already known about the topic, and explains the motivation for the study. The latter will often be an identified deficiency in the existing body of knowledge [11]. Having explained the background and rationale for the current study the author(s) should justify the use of any specific tools, techniques and approaches to be employed which may be considered experimental, non-routine or those not widely understood. Everyday or 'accepted' techniques do not require lengthy discussion or justification. Do not waste space explaining what will be done (this follows in the methods section); explain why it will be done.

Having summated and presented the current level of scientific knowledge on the topic under investigation, the introduction concludes by discussing the specific problem to be addressed by the author(s), perhaps suggesting specific hypotheses that lead to an explicit statement of the aim(s) of the research.

Methods (or materials and methods)

The methods section explains exactly what was done in carrying out the research that is being reported. While traditionally this section should provide enough detail to ensure the work is independently reproducible [4], a fine balance of the level of detail provided must be found to ensure that the work does not become unnecessarily long so as to 'scare off' or 'lose the interest' of readers [11]. The author(s) should ensure that non-expert readers unfamiliar with the work can still follow the basic logic.

This section should be sequential, clear and concise. Do not waste time explaining accepted approaches or equipment use [4] (i.e. none of us will

Table 1 The structure of a scientific paper

1	Abstract	Provides a concise overview of all major sections of the paper including key results and conclusions.
2	Introduction	Should provide justification for the study by identifying a niche area within the existing body of knowledge and also identifying specific aims or hypotheses that become the focus of the described research.
3	Methods	Should describe the way the study was carried out with sufficient detail to allow repeatability and to allow others to judge the scientific reliability of the work.
4	Results	Should describe the findings of the study without interpreting them.
5	Discussion	Allows the author(s) to interpret their findings and place them in the context of the previous knowledge in the field. Recognise limitations to work, sources of bias, areas for improvement and areas for future work.
6	Conclusions	Allows the author(s) to express the conclusions that can be drawn from the study in light of the presented findings.
7	Acknowledgements	Opportunity to thank and recognise those who have assisted or contributed to the study but are not named as co-authors.
8	Reference list	Source list of materials cited directly in the text.
9	Figures and tables	As appropriate to support the information contained in or message conveyed by the study.

benefit from a step by step guide to taking a chest X-ray if such a procedure was performed as part of your work). Where methods have been described previously, cite the former work to save repetition and unnecessary text [4] e.g. *Using a method previously described by Smith et al. ….* Finally, the methods section should describe the statistical techniques used in data analysis [4, 11].

Results

This section reports the findings of the current study relevant to the focus of the paper. Collateral data collected during the same project, but not directly applicable to current paper and its purpose, only confuses the reader, is unnecessary and should be omitted. Any new information collected, not directly related to the current study but of sufficient scientific merit or interest, should be considered for presentation in a separate paper. As a general rule, one paper should reflect the investigation of one principal hypothesis although several linked sub-hypotheses may be reported in the same work.

It is often easier to list the key results in order of importance [11] or in the order that they will be explored in the discussion section. Tables may be an appropriate way of summarising data and saving written text if concise and clearly presented [12]. However, be careful not to overuse them [4]. In many cases it may not be necessary to list the full data for individual subjects or tests; summary statistics may be a more appropriate means of conveying such information [4].

In reporting statistical outcomes in the results section, always explicitly state P values, rather than just $P < 0.05$ (too many authors fail to do this). Stating the full P value allows the reader to draw his or her own educated conclusions as to the likely significance of the result [11].

It is not appropriate to discuss the findings in this section [4], but rather to concentrate on stating the results. Remember that all findings to be discussed in subsequent sections must have been presented in this section. Conversely, any results which are not discussed further should be considered for omission as they may be irrelevant.

Discussion

This is the opportunity for the author(s) to discuss their findings in light of previous work, to discuss limitations [4], major assumptions and the generalisability of results and to highlight opportunities for future work. No new results should be discussed that have not previously been introduced [11]. It is common practice to begin the discussion section with a reiteration of the original purpose for the study or the original research aim or hypothesis [11].

Discussion of key results usually takes place in order of importance (matching the order in which they were presented in the results section). This section is often loosely linked to the key ideas raised in the introduction section. Compare and contrast findings with parallel or comparable work in the topic area. Discuss how the findings of your study may be considered e.g. to add support for a change to existing techniques or management pathways.

Where possible suggest rational explanations for unexpected or unusual results or outlying discrete data points. A sign of an experienced author and researcher is the ability to critically discuss his or her own work. Do not be afraid to state that a particular finding cannot be easily explained [11], the phenomenon may be more widespread than just your work and may be itself worthy of further investigation.

All identified limitations must be discussed or the author unjustly biases the information presented to the reader. Remember that in radiology and medical radiations we are often limited by things such as expense, ethical considerations, small patient population and equipment or specialist access. Although not an excuse to be lazy in recruitment, be aware that such factors may realistically limit available sample sizes. By discussing the limitations the author may identify opportunities for other work or improvements to the current work which may be the focus of future studies.

Conclusions

The main body of the manuscript usually finishes with a conclusion statement that may be included as an integrated part of the formal discussion section or listed as a separate heading. This section provides a concise summary of the key conclusions that can be drawn from the current work in light of the reported findings, placed in the context of any relevant earlier work. This is the opportunity for the author(s) to present to the reader the relevance of the work undertaken and to concisely define how this new information contributes to the existing body of knowledge. Recommendations for interpretation or application of the findings are usually reinforced succinctly at this point. No new material should be introduced to the paper in this section (i.e. all points discussed here should have been raised and addressed previously).

SUPPLEMENTARY MANUSCRIPT SECTIONS

There are several other sections that supplement the main body, that combine to complete the manuscript. The presentation and ordering of these sections vary between journals but they are all usually present in most scientific papers.

Acknowledgements

The acknowledgement section is usually only a couple of lines and is an opportunity for the author(s) to recognise the assistance and support of those associated with the study but who were not listed as authors [13]. Appropriate acknowledgements may be made to supervisors, statisticians and other support staff and those associated with the design and implementation of the study (e.g. non-author research assistants or data collectors). It is appropriate at this point to thank and recognise organisations that have contributed towards the funding of the study. Departments and institutions may sometimes also be appropriately thanked for their assistance and support. Study subjects should not be named for data protection reasons but may be made reference to generally at the discretion of the authors (i.e. *the authors wish to sincerely thank those persons who volunteered their time to participate in this study*).

Reference list

The reference list is usually the last text section presented sequentially in the manuscript, it lists all of the earlier work referred to in your article [4]. The journal Radiography employs the Vancouver referencing style. This system involves numbering the citations in the reference list in the sequential order that they appear in the text. For details of the specific presentation of the in-text citations and the reference list, refer to the 'Instructions to Authors' section found at the end of each edition of the journal.

Figures and tables

The use of figures and tables in a manuscript can be an excellent way of clearly and succinctly presenting large amounts of information or for ameliorating the need to include lengthy textual descriptions. Figures can often allow the reader a visual appreciation or spatial understanding of equipment and concepts relevant to the study being reported, while tables can be useful in providing large volumes of raw or analysed data and can be a simple means of demonstrating a direct comparison between two or more data sets.

Only figures or tables which are directly related to the current study and add some benefit to the work should be included [12]. Figures and tables that do not add direct benefit to the interpretation or understanding of the specific study being reported, even if they are of substantive or significant scientific merit, should be omitted. All figures and tables presented must be referred to at some point in the text. Any figures or tables included in the article for consideration for publication should be submitted at the end of the manuscript. If your article is accepted for publication, the editorial team will appropriately insert the figures and tables into the text to accommodate the final presentation format. Each figure or table should be provided on a separate page with its own caption (title). The caption should provide a brief description of the figure or table and provide a clear explanation of any labels. Where the manuscript includes more than one figure or table, a summary 'Captions List' should also be provided, listing the figures and tables in the order they would appear in the text.

Abstract

Having written the polished version of the manuscript, the final task is to prepare a concise abstract [4, 11]. The purpose of this section, which will precede your manuscript in the journal, is to provide an overview of all the major elements of your work, the rationale and justification, the method employed, the key result(s) and conclusions drawn. The 'Instructions to Authors' section of the journal Radiography asks that authors submitting their work for publication keep their abstracts to less than 250 words. Many junior authors will find it more difficult to write a quality piece for this brief section than any of the other much larger sections. One useful practical tip for starting the formation of the abstract comes from taking the key sentence or two from each of the major manuscript sections (i.e. introduction, methods, results, discussion and conclusions) and combining them sequentially. These sentences can then be modified to generate a succinct and integrated, flowing piece of writing summarising the reported work. Those seeking a more detailed understanding of the importance, structure and preparation of a scientific abstract should refer to the earlier work of Haynes *et al.* [14] titled: 'More informative abstracts revisited'.

Be aware that given the great diversity and volume of articles available for an avid reader, your abstract should draw the interest of the potential audience and provide an accurate but concise description of the study. Many readers will only read the abstracts, others will use the abstract as a guide as to whether or not to read the full article. This applies similarly to journal reviewers who are most likely to gain their first impression of your work from the abstract. The quality of the abstract has the potential to place a strong bias on the light in which the reviewer assesses the rest of the paper. Remember—first impressions last!

IN CONCLUSION

Although it may initially seem daunting, writing a manuscript for submission for publication need not be [15]. By following a widely accepted basic scientific design, authors can structure their work to present it in a format suitable for submission [15]. In logically addressing a handful of key headings, the process of manuscript writing can be made infinitely simpler than trying to write a single continuous research report.

Brevity and concision are important factors to consider when writing for publication [11], as are fundamental elements such as correct spelling and use of grammar. Always consider the likely target audience when constructing a research paper [4, 5, 12], as well as the discipline itself, as individual fields hold their own conventions as to the appropriate form that a manuscript should take.

It is hoped that this paper will prove useful in assisting student, junior and inexperienced researchers, within the medical radiations fields, in conveying their findings to others through publication in the College's official journal, Radiography. Those with no previous exposure to research may also benefit from learning how simple this process can become and may be inspired (or more inclined) to aid in the development of their own profession by initiating or participating in active research.

FOR FURTHER INFORMATION

For further journal specific information, pertaining to the preparation and submission of a scientific manuscript for consideration for peer-reviewed publication in the journal Radiography, refer to the 'Instructions to Authors' section found at the end of each edition or contact the Editor-in-Chief.

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UNIDAD I (continuación)

Objetivo 1: Desarrollar estrategias de lectura para la selección de información específica en inglés.

Contenido

III. Uso de marcadores textuales en textos científicos en inglés

Previo a la clase

1. Leer el texto “*Reading strategies”.*
2. Investigar una lista de conectores y clasificarlos en función de las relaciones que establecen en el texto. Incorporar dicha lista como parte de su material de apoyo para trabajo en aula.
3. Leer el texto “How to help a reader through an academic article? Signalling devices in research articles written by English and Serbian academics” y “Discourse markes”.
4. Investigar sobre diferentes marcadores textuales para diferentes secciones de un artículo de investigación.
5. Traer un artículo científico en inglés (pertinente para su trabajo de investigación), diccionario y otro material de apoyo **impreso** que considere necesario.

En clase

1. Discutir acerca de estrategias que se pueden usar durante el proceso de lectura y la necesidad de disponer de un número importante de estrategias para seleccionar.
2. Discutir acerca de los marcadores textuales (concepto, tipos e importancia).
3. Identificar algunos marcadores comúnmente utilizados en los artículos científicos.
4. Hacer el ejercicio formativo 1.

Ejercicio formativo 1

Se hará con el artículo científico en inglés pertinente para su trabajo de investigación que trajo al aula.

Luego de clase

1. Leer los textos titulados: “How to Read a CS Research Paper?” y “ Guidelines for reading academic and research papers”, los cuales deberá traer a la siguiente clase.

UNC COLLEGE OF ARTS & SCIENCES

Handouts and Links

Reading to Write

Contents

Reading strategies

Read (or at least skim) all parts of the reading. Sometimes the cover, title, preface, introduction, illustrations, appendices, epilogue, footnotes and "about the author" sections can provide you with valuable information.

Identify the genre of the reading. What kind of a reading is it? (Journal article? Mass media? Novel? Textbook?) Why was it written? Who does the author assume is going to read this work? (Books about politics written for an audience of political scientists, for example, might be very different from books about politics written for the general public, for historians, or for sociologists.)

Consider the author. What do you know or what can you learn about this person? Why did he or she write the book? What sources of information and/or methods did he or she use to gather the information presented in the book?

Get out a calendar and plan your reading. Get out a calendar and plan your reading. Plot the number of days or hours that it may take you to complete the reading. Be realistic. It may help to read one chapter of the reading and then revise your calendar—some readings take longer than others of a similar length. Visit the Learning Center if you'd like to learn more about scheduling your work or reading more quickly and effectively.

As you read, record your reactions and questions. Any reaction or question is valid, from the specific ("What's that word mean?") to the general ("What's her point?"). Write them down now so that you'll remember them later. These reactions and questions can serve as material for class discussion, or they can be the jumping off point for brainstorming a paper.

Read with a friend. Find someone else who is reading the same text. Set reading goals together and plan to share your reactions to sections of the reading before class, after class, over e-mail, and so on.

Think about what is missing in the reading. Issues, events or ideas that are missing, left out, avoided, or not discussed/addressed in the text might be important. Thinking about these omissions can give you a critical perspective on the reading by showing you what the author (consciously or unconsciously) doesn't want to deal with.

If you know you will have to answer a particular question in response to the reading, read with that question in mind. Sometimes faculty will give you essay questions in advance. As you read the text, refer back to those questions and think about your emerging answers to them.

Writing strategies

While reading

Write as you read. Record your reactions informally and briefly after you've read for a while. When you're done reading a section, write for five minutes to capture your personal thoughts, reactions, and questions as you go along.

Keep your notes with your book. Tuck a few sheets of paper or a notepad inside the book to record your ideas as you read.

Share your informal writing with a friend. Trade notes/questions/reactions to the book. Write five-minute responses to one another about the reading. This can be done by e-mail.

Draw while you read. Drawing pictures, maps or diagrams of relationships or important issues that you see emerging from the reading can help you understand them. Be willing to revise or redraw the map as you read.

After you read

React to the whole reading. Take twenty minutes to record your reactions to the reading as a whole. (Return to the reading strategies list to get you started if you need to.) Don't be afraid to guess, hypothesize, or follow a tangent.

Get out a calendar and schedule the time you will need to write your paper. Working backwards from the due date, plot a timeline for producing the paper. Include time for at least one rough draft and one chance to receive feedback from others (a friend, your teaching assistant, your professor, the Writing Center, etc.) before turning it in.

Plan your research and think about citation. If the assignment requires library research, clarify a strategy for collecting and citing sources as you research and write. Be sure to cite any quoted information or information that was not generated by your own analysis. Your instructor can answer all of your questions about this important step.

Write a draft, preferably a few days before the paper is due. Instructors can usually tell the difference between papers that have been carefully drafted and revised and papers that have been hurriedly written the night before they are due. Papers written the night before often receive disappointing grades.

Get feedback from at least one person, and preferably several people, before you finalize your draft. When possible, give your readers a copy of the assignment, too. E-mail can make this process easier. See the Writing Center handout on feedback.

Proofread your paper to catch errors before handing it in. Taking the time to spell-check and proofread will make your paper easier to read and show your reader that you cared about the assignment. The Writing Center handout on proofreading may help.

When you get your paper back

Read all of your instructor's comments. Assess your strengths and weaknesses in completing this reading/writing assignment. Plan what adjustments you'll make in the process for the next reading/writing assignment you will undertake. It may help to save all of your old papers so that you can refer back to them and look for patterns in your instructor's comments. You may also want to keep a small notebook for your own assessment—writing down that you didn't leave ample time for revision on one paper, for example, may help you remember to schedule your time more effectively for the next paper.

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HOW TO HELP A READER THROUGH AN ACADEMIC ARTICLE? SIGNALLING DEVICES IN RESEARCH ARTICLES WRITTEN BY ENGLISH AND SERBIAN ACADEMICS

UDC 001.81:81'42(497.11) 001.81:81'42(41+73)

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Abstract. *The paper presents a contrastive-linguistic study which examines the employment of linguistic devices (such as logical connectors, sequencers, reminders, announcements, topicalizers and action markers) by which academic writers guide their readers through academic texts. The employment of these linguistic signals is a recommended writing convention within Anglo-American writing cultures, but not sufficiently recognized by a number of non-English academic writers. This assumption is a starting point in our research conducted to compare the use of linguistic signals in academic articles in three scientific disciplines (chemistry, geology and ecology) written by English and Serbian academic writers, as well as to interpret the obtained results in the light of J. Hinds' (1987) new language typology which deals with 'reader's vs. writer's responsibility' for understanding a piece of academic writing. The results of the research show that signalling devices are differently used by the two groups of academics (approx. 62 tokens per 10,000 words in the English academic discourse and 31 tokens per 10,000 words in Serbian academic writers), so that it can be concluded that Serbian academic writing is more 'the reader-orientated' type of discourse, in contrast with English academic style. Besides presenting the results of the conducted research,the aim of the paper is to offer a model by which the use of signalling devices in academic writing could be examined, but also to draw attention to their importance when writing for international academic community.*

Key words: *Writing cultures, academic discourse, signalling devices, non-English academic writers, international academic community.*

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INTRODUCTION

Although we are all aware of the widely recognized assumption about the universal character of the language of science and human knowledge and of the fact that the concepts and procedures of scientific research constitute a secondary cultural system independent from primary systems of different societies (Widdowson 1979: 61), there are still certain aspects of this language which bear culturally-specific elements. These elements vary from culture to culture and reflect the writing habits that the authors have acquired within their own writing cultures, especially those concerning the way by which academic writers present propositional contents to a respectable audience, i.e. to an academic disourse community. However, if the international academic community is a target audience for non-English academics, nowadays accustomed to receiving most of academic publications almost exclusively in English, the question they might ask themselves is how to produce an effective academic text in English in order to be adequately evaluated and accepted by an international readership. This question is not an easy one, since writing for academic purposes goes far beyond the mere knowledge of the English language – it includes the knowledge and practice of writing conventions of the English academic discourse, i. e. the mastering of good writing skills in this language.

One of the writing conventions that the English writing style cherishes is the request for 'the reader-friendly discourse'(Leńko-Szymańska2008), which means that an academic writer is expected to make all possible efforts in his/her piece of writing in order to help the reader through the text. This means that his/her writing should be clearly expressed by explicitly laid out ideas in order to meet the reader's 'discourse expectations' (Clyne 1987), which means, to be constructed the way an academic reader expects it to be[1]. Also it should employ a sufficient number of linguistic devices to signal the writer's stance and to guide the reader through the text (Hinds 1987). This demand is usually not easily acquired by non-English academics, whose national writing styles may operate under completely different conventions – not until these writers are made conscious of the existing differences in the two writing styles. However, the first step of a non-English academic in approaching the English type of discourse is to recognize the characteristics of his/her own writing style. This very idea underlies the research intended to compare linguistic signals which English and Serbian authors of academic articles use in order to facilitate their readers' journey through the text The method used in the research may serve as a model for examining the way signalling devices are used by non-English academics since it reveals how close or remote non-English writing styles are to the English writing style.

THE THEORETICAL ASSUMPTION OF THE RESEARCH

The research is based on the theoretical assumption put forward by an American linguist, John Hinds, in his famous article "Reader Versus Writer Responsibility: A New

[1] An English academic reader expects an academic text to demonstrate a high degree of linear progression and unity, which are established as the most important requirements for a well-written piece of academic text: "… for English readers, unity is important because readers expect, and require, landmarks along the way. Transition statements are very important. It is the writer's task to provide appropriate transition statements so that the reader can piece together the thread of the writer's logic which binds the composition together", Hinds, 1987: 146).

Typology"[2]: "…that there are different expectations with regard to the degree of involvement a reader will have, and that this degree of involvement will depend on the language of the reader" (Hinds, 1987: 141). This statement conspicuously points at the cultural differences that exist in the way the writer approaches his/her reader: in some writing cultures the responsibility for the successful communication between the writer and the reader rests with the writer. The writer should make his/her writing as clear and reader–friendly as possible, not only by conveying the propositional content in a logical and explicit way, but also by employing a variety of language devices to signal the writer's stance and to guide the reader through the text. In reader-responsible writing, on the other hand, the responsibility to find the way through the text and extract the author's intentions and ideas is left to the reader. The reader is the one who is to make efforts in deciphering a piece of writing. Thus, according to J. Hinds, writing cultures could be distinguished in respect to writer's vs. reader's responsibility for successful written communication: the Anglo-Saxon tradition is said to belong to 'the reader-oriented' one, while the Serbian writing culture has not been classified by this parameter yet. So, my research is an attempt to classify it in this respect.

THE SIGNALLING DEVICES AND THEIR CLASSIFICATION

The subject of the research, labelled 'signalling devices', can be defined as 'natural language expressions whose primary function is to facilitate the process of interpreting the coherence relation(s) between a particular unit of discourse and other, surrounding units and/or aspects of the communicative situation' (Risselda &Spooren1998:132). They constitute a group of words and expressions which is syntactically and semantically heterogeneous – the reason why it has to be defined first and classified into a classification model suitable for the examining material. The model which we suggest here is the combination of two classification systems offered in the relevant literature by VandeKopple 1985[3], and by Crismore& Farnsworth 1993, slightly adjusted to the examining material, with a new group of elements added. Namely, the frequent use of expressions (especially by Serbian authors) by which writers paraphrase their own words in order to clarify them, has made us introduce a new group of signaling devices, conveniently called 'reworders'. So, the systematization of signalling devices for the purpose of this research comprises seven groups, named as: 1) Logical connectors, 2) Sequencers, 3) Reminders, 4) Announcements, 5) Topicalizers, 6) Reworders, and 7) Action markers. (The examples of each of them, as found in English and Serbian corpus and marked with ENG and SER, are presented bellow):

[2] The article "Reader Versus Writer Responsibility: A New Typology", published in 1987, is in line with some 'new typology' trends, such as Greenberg's typology (Greenberg 1963) – a typology in which languages are distinguished according to certain basic factors of word order; then a typology which takes into consideration whether sentences are typically 'situation-focused' or 'person-focused' (Monane and Rogers, 1977: 135); the one (Thomson 1978) which distinguishes lanaguages based on whether they use a word order which indicates grammatical relationships (as it is in English), or one in which the movement of consituents is free of grammatical restrictions (as in Spanish), and alike.

[3] Although VandeKopple insisted on the employment of both logical and temporal connectors, we have dropped out the group of temporal connectors, as suggested by Crismore, A. & R. Farnsworth, who argue that the analysis of this kind should deal with the linguistic devices which help readers 'understand how the text is connected rather than how events outside the text are related to each other temporally' (Crismore, A. & R. Farnsworth 1993: 46).

1) Logical connectors express a logical relation between two parts of the discourse, i.e. ideas or blocks of information (*however, thus, moreover*):

ENG: Proportionality between voltametric current and diffusion coefficient. Accordingly, we chose to potentiostat the microdisk working electrode, at potentials continuously producing a radial diffusion-limiting, steady state current.

SER: Kao što se vidi, za relativno male energije adsorpcije drastično su pomerene oblasti stabilnosti adsorbovanih hidroksida u kiselu oblast. Prema ovome, potpuno je opravdano očekivati i hidrokside metala u adsorbovanom stanju i u kiselim rastvorima.

2) Sequencers serve to signalize the order in which the elements of propositional content appear in a discourse (*firstly, secondly, thirdly)*, although the use of numbers for this purpose is commonly found as well:

ENGL: The extended description can be simplified by making use of additional assumptions concerning a continuous-flow system. Firstly, the total effective volume Vaq, of the continuously renewed aqueous phase in contact with the membrane can be set equal to infinite. Secondly, the concentration gradients within the aqueous phase are assumed to be restricted to a steady-state diffusion layer (Nernstain layer) of given average thickness.

SER: Tek razvoj nuklearne fizike (kako eksperimentalne tako i teorijske) u tridesetim godinama XX veka omogućio je da se problemu nastanka hemijskih elemenata priđe na jedan čisto naučni način. Pre svega, pokazalo se da hemijski elementi mogu i moraju nastajati u zvezdama i da su poreklo elemenata i evolucija zvezda dve najintimnije povezane problematike. Drugo, pokazalo se da se na sva najvažnija pitanja u vezi porekla hemijskih elemenata odgovori mogu dati bilo na osnovu astrofizičkih merenja bilo na osnovu nuklearno-fizičkih laboratorijskih eksperimenata. Treće, teorijska nuklearna fizika i astrofizika daju jedan celoviti adekvatan opis procesa nukleosinteze u zvezdama.

3) Reminders are used to connect the previously exposed part of propositional material with the one which follows, by reminding the reader to it (*As stated earlier, as suggested above*)...

ENG: It was suggested above that the fault overlap zone illustrated by this may offer a greater productability, combining strained ground with no through-going fracture.

SER. Pored njih javlja se, kao što je gore pomenuto, manja partija glinaca, koja se proslojava sa tankoslojevitnim biomikritima.

4) Announcements serve to announce the propositional content to the readers (*I shall show below, as it will be seen in the next section)*:

ENG: As will be discussed later, this antibody coverage was also sufficient to provide rapid binding of analyte to the column, with greater than 99% of the PHP being extracted from a sample in as little as 6s.

SER: Međutim, to ni izdaleka nije tako kao što će se videti na nekoliko primera.

5) Topicalizers are used to introduce the theme (topic) into consideration *(In this regard, With regard to, In reference to):*

ENG: With regard to the element distribution during the digestion process, results of the concentration of the elements and ash content of the coal extracts are shown in Table 3.

SER: Što se tiče porekla elemenata i jedinjenja, odnosno onih materija i komponenata koje ih čine "mineralnim", sigurno je da obogaćivanje mineralnim komponentama nastaje u zemljinoj kori kao sredini u kojoj se termomineralne vode nalaze, odnosno u kojoj imaju svoja ležišta.

6) Rewords serve to connect two statements in a certain discoursal unit by means of explaining previously said in a more precise way (*that is to say, so to speak, in other words*):

ENG:Thus, TG-Lc is an effective method of gradient separation, precisely in the chromatographic region where the ability to perform gradient separations is necessary, at long retention times.

SER: Uprošćeno rečeno, pri potencijalima koji su za oko 0,5 V negativniji od potencijala stvaranja AgCl, metalno srebro u rastvoru Cl' jona prevuklo se monoslojem AgCl.

7) Action markers have a role to present to the readers the type of a discourse action that will be undertaken in the part of the paper that follows (*to sum up, to give an example*):

ENG: Thus we conclude that the activation energy for the loss of F^0 is high relative to that for the loss of $CF2^0$.

SER: Navodimo dva specijalna slučaja gornje jednačine koja su interesantna za istraživanja o kojima je bilo govora u prethodnim odeljcima.

THE RESEARCH MATERIAL AND THE METHOD OF THE RESEARCH

The research material comprised 30 articles from three sciences (chemistry, geology and ecology) written by English academics and the same number of articles written by Serbian academics. To ensure comparability between the two sets of corpora, all research articles contained approximately 5.400 words each, so that each of the examined corpora contained 150, 000 words. Since this research is intended as an introduction to a more detailed and comprehensive study of the Serbian academic discourse, at this stage, only the essential criteria for comparing the research articles from the two discourses are included, i.e. the same length of the articles and the same scientific fields to which they belong. However, further research should include some more criteria, such as the previous experience of the academics (whether they are experienced academic writers or novice writers, whether they have published for international readership or not), etc.

The first step in the methodology applied in the research was to identify seven groups of signalling items in both corpora and then to count the number of their appearances in each of them, regardless of the academic discipline to which an article belongs. The occurrence of the signaling devices has been counted in each of the articles, and then summed up to get the number for each of sub-corpora. Then the tokens per 10, 000 words were counted so that we were allowed to draw a conclusion referring to the use of signaling devices by English and Serbian authors in general, but at the same time to notice the authors' preferences concerning the use of a specific group of signalling devices. Additionally, in order to obtain more accurate results and make valid conclusions on the basis of statistically significant data, a statistical test (Pearson Chi-Square value) was applied.

COMPARISON OF DATA

Table 1. The number of signalling devices in total and per 10,000 words in the two corpora

Corpus	Items found	Tokens per 10,000 words
English (ENG)	986	61,62
Serbian (SER)	510	31,18
Total:	1, 496	93,5
Chi^2	152,21	
p-value	0,0001	

The Chi-Square value for the association between English and Serbian corpus was obtained as 152.21 with 1 degree of freedom and a Significance Probability equals 0.0001, which represents a highly significant result. On the evidence of this data, there is a significant difference between the number of signalling devices overall (English 986, Serbian 510, on the total of 150,000 words for each corpus).

Table 2. Types of signalling devices in the two corpora

	Items found in English corpus	Items found in Serbian corpus	Chi^2	p-value
Logical connectors	758	391	117,22	0,000
Sequencers	19	7	5,54	0,019
Reminders	58	28	10,46	0,001
Announcements	31	17	4,08	0,043
Topicalizers	9	6	0,6	0,439
Reworders	17	29	3,13	0,077
Action markers	94	32	30,51	0,000

As for the detailed distribution of the signalling devices in the two corpora, it can be noticed that English academics use logical connectors, sequencers, reminders, announcements and actions markers more frequently than their Serbian colleagues, since the p value for each of these groups of devices is smaller than 0.05, which points at the statistically significant difference in their distributions. So, the values for the five groups of signaling devices, when compared, look this way: logical connectors (Pearson Chi^2=117.22, p=0.000), sequencers (Pearson Chi^2=5.54, p=0.019), reminders (Pearson Chi^2=10.46, p=0.01), announcements (Pearson Chi^2=4.08, p=0.43) and action markers (Pearson Chi^2=30.51, p=0.000).

However, although it seemed at the first sight that Serbian academics tend to use topicalizers and rewordes more often than English academics, a precise analysis has proved that it is not the case, since there is no statistically significant difference in their distributions in the two examined corpora: topicalizers (in the Serbian corpus 9 vs 6 instances in 150,000 words, Pearson Chi^2=0.6, p=0.439; reworders (in the Serbian corpus 29 vs. 17 instances in 150,000 words, Chi^2=3.13, p=0.077).

THE INTERPRETATION OF THE RESULTS IN THE LIGHT OF HINDS' NEW LANGUAGE TYPOLOGY

The obtained results unequivocally speak in 'favour' of English academic authors, i.e. of their inclination to use signalling devices abundantly through their texts (approx. 62 tokens per 10,000 words). This fact reflects the English academic style and supports the idea that it is the writer's duty to provide his/her readers with the guidelines through the text in order to facilitate their way through it. However, according to the number of signalling devices used in Serbian academic texts (31 tokens per 10,000 words, and p value 0,0001), it seems that the idea about their importance in academic writing is not sufficiently recognized among Serbian writers: almost all signalling devices are approximately two times more often used by English academics, except for action markers used by English writers – they outnumber even by three times the same group of signalling devices used by Serbian writers. Only the use of reworders and topicalizers does not follow the same tendency: although there are more instances of reworders found in the Serbian corpus, their overall number does not show any statistically important difference in comparison with the number of the same type of signalling devices in the English corpus, so that one cannot outspokenly say that they are favoured by Serbian academics. Similarly, the difference in number of topicalizers used by English and by Serbian writers is so small and statistically unimportant that it can be neglected.

According to Hinds' language typology and on the basis of the obtained data, the Serbian academic discourse can be described as a discourse which relies on the 'reader's rather than on the writer's responsibility' for effective communication. It must be noted that since sharing the same writing habits and beliefs, Serbian academics do not have, understandably, any problem in communicating their ideas to their Serbian colleagues, but the question is to which degree their texts are communicative when presented to the international academic community, even if written in an acceptable form of the English language. Here another aspect of non-native English academic writing comes into play: the transfer from the mother tongue writing style which may hinder successful communication on a global scale (Blagojević 2011). Namely, it is highly realistic to expect that the habit of Serbian academics to avoid using signalling devices in their writing[4] can be easily transferred to their writing in English for international readership.

CONCLUSION

Although there is a myth among the academics in hard sciences that scientific facts speak for themselves (Latour 1987) and that the form in which they are presented is not important, modern linguistic studies have proved that in the modern world scientific re-

[4] This practice commonly occurs within educational systems which neglect academic writing courses in favour of developing only the creative type of writing, as it is the case in the Serbian education.

searches are almost as important as the ways they are communicated world widely. This fact also supports the concept of respecting the time of modern readers who appreciate when they are offered information in a smooth and easy way: any unnecessary effort in deciphering an academic text will take the time they may allot to grasping a new piece of information. Accordingly, the idea that an academic writer should make an effort to help readers through the text can be considered as a request of modern academic writing in general, not just as a mere convention practiced by Anglo-American academic writers who promote a reader-friendly type of academic writing. For that reason, it seems reasonable that modern academic writing courses should include the notion of signalling devices and make their importance obvious to non-English academic writers when they write for international academic communication.

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RESEARCH MATERIAL

1. Texts written by English writers (ENG)
   Analitical chemistry, American Chemical Society, Washington, editions from 2005 -2008.
   European Coal Geology and Technology, Geological Sociaty Special Publication, London, editions from 2003 - 2009.
   Enviromental Pollution, Elsevier Science, Great Britain, editions from 2001 – 2007

2. Texts written by Serbian writers (SER)
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KAKO POMOĆI ČITAOCU KROZ AKADEMSKI TEKST? ANALIZA JEZIČKIH 'SIGNALA' U AKADEMSKIM TEKSTOVIMA ENGLESKIH I SRPSKIH AUTORA

Savka Blagojević

Rad predstavlja studiju iz kontrastivnih jezičkih istraživanja koja se odnose na proučavanje zastupljenosti jezičkih sredstava pomoću kojih autor teksta vodi svoje čitaoce kroz tekst (kao što su ona koja logički povezuju delove sadržaja, označavaju redosled izlaganja sadržaja, podsećaju na izloženi sadržaj, najavljuju izlaganje sadržaja, ističu temu izlaganja, služe za preformulaciju iskaza i označavaju diskursnu radnju). Korišćenje ovih 'jezičkih signala' u angloameričkom akademskom diskursu je deo akademskog stila, međutim, ne i u akademskom pisanju autora koji ne pripadaju toj pisanoj zajednici. Iz tog razloga, istraživali smo i upoređivali korišćenje jezičkih signala u akademskim člancima engleskih i srpskih autora iz tri naučne discipline – hemije, geologije i ekologije, da bi dobijene rezultate interpretirali u svetlu 'nove jezičke tipologije' Dž. Hajnsa po kojoj se jezici dele na one koji se za čitaočevo razumevanje teksta oslanjaju na autorovu, odnosno čitaočevu odgovornost. Cilj rada je da ponudi klasifikacioni model po kome se korišćenje jezičkih signala može ispitivati u akademskim tekstovima autora iz različitih pisanih kultura, a isto tako da ukaže na značaj upotrebe ovih sredstava kada se piše na engleskom jeziku za potrebe akademske međunarodne zajednice.

Ključne reči: *jezički signali, angloamerički akademski diskurs, akademski članci, akademska međunarodna zajednica*

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DiscourseMarkers

Discourse markers (words like 'however', 'although' and 'Nevertheless') are referred to more commonly as 'linking words' and 'linking phrases', or 'sentence connectors'. They may be described as the 'glue' that binds together a piece of writing, making the different parts of the text 'stick together'. They are used less frequently in speech, unless the speech is very formal.

Without sufficient discourse markers in a piece of writing, a text would not seem logically constructed and the connections between the different sentences and paragraphs would not be obvious.

Care must also be taken, however, to avoid over-use of discourse markers. Using too many of them, or using them unnecessarily, can make a piece of writing sound too heavy and 'artificial'. They are important, but must only be used when necessary.

FAQs

1. What are the different discourse markers that can be used? ...read

2. How can sentence connectors be replaced in order to increase variety in writing? ...read

3. How are paragraphslinkedtogether? ...read

Discourse markers in a sample passage of academic English

What are the different discourse markers that can be used?

There are many discourse markers that express different relationships between ideas. The most common types of relationship between ideas, and the sentence connectors that are most often used to express these relationships, are given in the table below. The discourse markers in the table are generally used **at the start of a phrase or clause**. (a clause is a minimal grammatical structure that has meaning in its own right, and consists of a subject and verb, and often an object too). Sentence connectors do not always begin a completely new sentence; they may be separated from the previous idea with a semi-colon.

Type of relationship	Sentenceconnectors	Position withinclause/sentence
Addingsomething	Moreover; In addition; Additionally; Further; Further to this; Also; Besides; What is more.	Initial position
Making a contrast between two separate things, people, ideas, etc.	However; On the other hand; In contrast; Yet.	Initial position
Making an unexpected contrast (concession)	Although; Even though; Despite the fact that; In spite of the fact that; Regardless of the fact that.	Initial position Starts a second/ subordinate clause
Saying why something is the case	Because; Since; As; Insofar as.	Initial position Starts a second/ subordinate clause
Saying what the result of something is	Therefore; Consequently; In consequence; As a result; Accordingly; Hence; Thus; For this reason; Because of this.	Initial position
Expressing a condition	If; In the event of; As long as...; So long as...; Provided that...; Assuming that...; Given that....	Initial position Starts a second/ subordinate clause
Making what you say stronger	On the contrary; As a matter of fact; In fact; Indeed.	Initial position

There are two particular features of the sentence connectors indicated above :

- Sentence connectors can be used to begin a new sentence or a new clause that follows a semi-colon.
- Some sentence connectors can be placed in different positions within the sentence: initial position (e.g. **Because** he is ill, he needs to rest.) and 'mid-way position' at the start of another clause (e.g. He must rest, **because** he is ill).

How can sentence connectors be replaced in order to increase variety in writing?

In your writing, you will want to spend some time ensuring that your work has a sense of variety. In order to do this, you might think of the following :

Use conjunctions as well as/instead of sentence connectors. A conjunction is a word like and, but, etc, which is used to join two ideas together into a complex sentence. Unlike sentence connectors such as 'However', etc, a conjunction cannot be used at the beginning of a sentence and must come at a mid-point, at the end of one clause and the beginning of another. It is usually possible to rephrase a pair of sentences that use a sentence connector by using a conjunction instead. For example, instead of saying 'He studied French; however, his wife studied Physics', it might actually be more natural to say 'He studied English **but** his wife studied Physics'. Similarly, instead of saying 'English is hard; therefore, one must spend a lot of time practising it', we can say: 'English is hard **so** one must spend a lot of time practising it.' These are simple examples, but the principle of paraphrase can be extended to other, more complex sentences.

Use conjunctions at least some of the time. Words like and and but may seem boring, but they help to lighten the style of your writing. This in turn helps the writing to sound less pompous and formal. And in any case, in writing, it is often helpful to use a variety of structures rather than just saying things in one way.

It can also be helpful to omit discourse markers if they do not serve any useful purpose. Knowing when to omit the discourse marker is a subtle aspect of language use and comes with more practice and wider reading.

Try joining two clauses together by making one **subordinat**e to the other. If we go back to the sentence 'He studied English but his wife studied Physics', we can rephrase this as follows : 'He studied English **whereas** his wife studied Physics', or 'He studied English **while** his wife studied Physics.' The clause beginning with **while/whereas** is subordinate. this means that it is used to qualify/add extra information to the sentence, but cannot stand on its own.

Remember, it can be tedious to read a piece of writing which has too many discourse markers. The writing can seem pedantic, heavy and over-pompous. You are ideally seeking a light, flowing style, not a heavy or forced one.

How are paragraphs linked together?

In much the same way that ideas within a paragraph are linked, a new paragraph must be linked in some way with the previous one. This, too, necessitates the use of discourse markers.

Here are some different ways in which the opening of a paragraph can link back to what has happened before. The three basic types of paragraph-paragraph relationship are: reinforcement of idea; contrast of idea; and concession. Indicating these relationships builds a 'bridge' between paragraphs and makes reading the text easier.

Relationshipwithpreviousparagraph	Possiblelinguistic formula
Reinforcement of idea	a) A further example of this phenomenon can be seen in Foucault's work. b) Jones (1999) further demonstrates this point in his most recent research.
Contrast of ideas	a) Jones, meanwhile/on the other hand, expresses this notion as 'self-defence'. b) This argument is not, however, accepted by all critics. For instance, Smith (1999) holds that....
Concession	a) Although the ideas of Jones (1999) are interesting and useful, they do not take account of the growing problems of identity theft. b) While Roberts (2006) emphasises the importance of Foucault's notion of the panopticon, the opposite view is held by other commentators. Forexample,...

In your own writing, it is useful to consider the following points :

- Do my paragraphs serve a definite purpose?
- What is the exact link between the paragraph I have written and the previous paragraph? Isthat link clear?
- Are my paragraphs laid out **strategically**, in order to help me to organize my materials to best effect?
- Do my paragraphs help me to build up my ideas in a logical and gradual fashion?

Source: http://www2.warwick.ac.uk/fac/soc/al/learning_english/leap/grammar/discourse/

UNIDAD I (continuación)

Objetivo 1: Desarrollar estrategias de lectura para la selección de información específica en inglés.

Contenido

III. Uso de marcadores textuales en textos científicos en inglés

Previo a la clase

2. Leer los textos titulados: “How to Read a CS Research Paper?” y “Guidelines for reading academic and research papers”
3. Traer un artículo científico (en inglés) de un área de su interés para leer y hacer un ejercicio práctico en el aula.

En clase

1. Discutir acerca de cómo hacer una revisión crítica de un artículo científico.
2. Hacer el ejercicio formativo 2

Ejercicio formativo 2

Se usará para este ejercicio el artículo titulado “Is There an Association Between Weight and Dental Caries Among Pediatric Patients in an Urban Dental School? A Correlation Study”. Las instrucciones serán dadas en clase. Deberá traer el artículo y un diccionario u otro material de apoyo impreso que considere necesario.

Luego de clase

1. Ejercitar la lectura crítica guiada de artículos científicos usando para ello aquéllos relacionados con su investigación.
2. Preparar para la siguiente clase lo necesario para el ejercicio evaluado.

How to Read a CS Research Paper?

Philip W. L. Fong

July 15, 2004

This article highlights some points a young researcher should bear in mind when reading a CS research paper.

1 Comprehension

The first lesson to reading research paper is learning to understand what a paper says. A common pitfall for a beginner is to focus solely on the technicalities. Yes, technical contents are very important, but they are in no way the only focus of a careful reading. In general, you should ask yourself the following four questions when you are reading a research paper.

1. **What is the research problem the paper attempts to address?** What is the *motivation* of the research work? Is there a *crisis* in the research field that the paper attempts to resolve? Is the research work attempting to overcome the *weaknesses* of existing approaches? Is an existing *research paradigm* challenged? In short, what is the *niche* of the paper?

2. **What are the claimed contributions of the paper?** What is *new* in this paper? A new *question* is asked? A new *understanding* of the research problem? A new *methodology* for solving problems? A new *algorithm*? A new breed of software *tools* or *systems*? A new *experimental method*? A new *proof technique*? A new *formalism* or *notation*? A new *evidence* to substantiate or disprove a previously published claim? A new *research area*? In short, what is *original* about this paper?

3. **How do the authors substantiate their claims?** What is the *methodology* adopted to substantiate the claims? What is the *argument* of the paper? What are the major *theorems*? What *experiments* are conducted? *Data analyses*? *Simulations*? *Benchmarks*? *User studies*? *Case studies*? *Examples*? In short, what makes the claims *scientific* (as opposed to being mere opinions[1])?

4. **What are the conclusions?** What have we *learned* from the paper? Shall the *standard practice* of the field be changed as a result of the new findings? Is the result

[1] Alternatively, what makes it a research paper rather than a *science fiction*?

generalizable? Can the result be applied to *other areas* of the field? What are the *open problems*? In short, what are the *lessons* one can learn from the paper?

Every well-written research paper contains an *abstract*, which is a summary of the paper. The role of an abstract is to outline the answers to the above questions. Look therefore, first to the abstract for answers. The paper should be an elaboration of the abstract.

Another way of looking at paper reading is that every good paper tells a *story*. Consequently, when you read a paper, ask yourself, "What is the plot?" The four questions listed above make up an archetypical plot structure for every research paper.

2 Evaluation

An integral component of scholarship is to be critical of scientific claims. Fancy claims are usually easy to make but difficult to substantiate. Solid scholarship involves careful validation of scientific claims. Reading research paper is therefore an exercise of critical thinking.

1. **Is the research problem significant?** Is the work scratching *minor itches*? Are the authors solving *artificial problems* (aka *strawman*)? Does the work enable *practical applications*, deepen *understanding*, or explore *new design space*?

2. **Are the contributions significant?** Is the paper *worth reading*? Are the authors simply *repeating* the state of the art? Are there real *surprises*? Are the authors aware of the relation of their work to *existing literature*[2]? Is the paper addressing a well-known *open problem*?

3. **Are the claims valid?** Have the authors been *cutting corners* (intentionally or unintentionally)? Has the right theorem been proven? Errors in proofs? Problematic experimental setup? Confounding factors? Unrealistic, artificial benchmarks? Comparing apples and oranges? Methodological misunderstanding? Do the numbers add up? Are the generalizations valid? Are the claims modest enough?

3 Synthesis

Creativity does not arise from the void. Interacting with the scholarly community through reading reseach papers is one of the most effective way for generating novel research agendas. When you read a research paper, you should see it as an opportunity for you to come up with new research projects. The following is a list of questions you can ask to help in this direction. (Of course, this list is not supposed to be exhaustive.)

[2]Be very sceptical of work that is so "*novel*" that it bears no relation to any existing work, builds upon no existing paradigm, and yet addresses a research problem so significant that it promises to transform the world. Such are the signs that the author might not be aware of existing literature on the topic. In such a case, the authors could very well be simply repeating works that have already been done decades ago.

- What is the crux of the research problem?
- What are some alternative approaches to address the research problem?
- What is a better way to substantiate the claim of the authors?
- What is a good argument against the case made by the authors?
- How can the research results be improved?
- Can the research results be applied to another context?
- What are the open problems raised by this work?
- Bottomline: Can we do better than the authors?

4 Paper Review

A paper review is a short essay (3–4 pages) reporting what you have learned from reading a research paper. Writing reviews for the papers you have read is a great way to sharpen your paper reading skills. Such a review is typically structured in three sections — *summary*, *evalution*, and *synthesis*.

1. **Summary.** Give a brief summary of the work *in your own words*. This section demonstrates your understanding of the paper, and as such it should answer the four questions outlined in Section 1. It is imperative that you use your own words to summarize the paper. Another way to think of it is that you are writing an alternative, elaborate *abstract* for the paper.

2. **Evaluation.** Evaluate the work by answering the questions outlined in Section 2. Learn to be fair: point out both the strengths and weaknesses of the work. If you are reading a classical paper that has been published for a while, make sure you are reading the paper in the right historical context: What seems to be obvious now might have been ground-breaking then.

3. **Synthesis.** Generate any interesting thoughts you have on the work by consulting the list of questions in Section 3.

5 Related Work

The classic by Adler and van Doren [1] provides lots of wisdom on how to read a book. The guide by Murphy and Griswold also provides a helpful introduction to reading an engineering research paper [3].

When a research paper is submitted to a conference or a journal, it will undergo a *peer review* process, in which the paper is subject to the intense scrutiny of peer researchers. The *referees* who review the submitted paper will read the paper in more or less the same way as we outlined in Sections 1 and 2, and then they will write up a *referee report* in a style similar to the paper review discussed in Section 4. Based on the referee reports, the program chair of a conference or the editor of a journal will then make the decision of whether to accept the paper. It is therefore instructional to understand how a referee go about reviewing a paper, and learn to read research papers like a professional. A very good introduction to the subject can be found in an article by Smith [5]. The paper is slanted towards experimental computer science. For a perpective focusing on theoretical computer science, consult the article by Parberry [4]. See also [2].

References

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[3] Gail Murphy and Bill Griswold. How to read an engineering research paper. `http://www.cs.ubc.ca/ murphy/cpsc507/winter02/documents/reading-eval.htm.`

[4] Ian Parberry. A guide for new referees in theoretical computer science. *Information and Computation*, 112(1):96–116, 1994.

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Guidelines for reading academic and research papers

- first step *before* reading the text: what do you already know or think about the topic? - brief brainstorming for determining and making explicit your own point of departure / your background knowledge

(note: not all of the following questions may be relevant for every individual paper!)

- What is/are the object(s) of investigation? (”topic”)
- What are the aims of the study? Were they reached?
- What is the structure of the text?
- How are crucial items/aspects defined?
- Are there any clear hypotheses? Are they confirmed or disproved?
- Which perspective is taken on the topic? (e.g. linguistic; philosophical; psychological etc.)
- Are there any theoretical foundations of, motives for or consequences from the study? Which are they?
- How does the study position itself vis-à-vis other approaches?
- Which type of analysis is employed? (general methodology)
- What kind of data and, if appropriate, method of data collection is used?
- What are the central results of the analysis?
- What are the author’s conclusions drawn from the results?
- Which questions are left open/unresolved? Why?
- Are there any explicit problems/points for further investigation highlighted by the author?
- Evaluation: What are the strengths or weaknesses of the article? Is there anything that might have been done or presented in a different / better way?

- do not *only* use a text marker, but make extra notes (it will increase both your understanding of the text and the amount of information remembered later)
- check all the words (whether terminology or not) you do not know or are not absolutely sure about in a dictionary!

Is There an Association Between Weight and Dental Caries Among Pediatric Patients in an Urban Dental School? A Correlation Study

Andres Pinto, D.M.D., M.P.H.; Suhn Kim; Rose Wadenya, D.M.D., M.S.; Howard Rosenberg, D.D.S., M.S.D., M.Ed.

Abstract: Obesity in the young is a public health priority. The prevalence of overweight children in the United States has risen almost threefold in the last two decades. An association between weight and oral health has been suggested in adults, whereas evidence supporting this association in children is controversial at best. The aim of our study was to evaluate the association between weight and dental caries in a random prospective cohort of children at their initial visit at an urban dental school. One hundred and thirty-five children were recruited in a four-month period. The DS/ds index was used to assess caries, and BMI percentile was calculated based on age and gender-adjusted published scales. Correlation analyses, linear, and multivariate regression including age, gender, and BMI were calculated with a significance threshold of $p>0.05$. No correlation between dental decay in obese and non-obese children was detected ($p=0.99$). These findings support recent U.S. population-based literature that reports an inverse association between caries and weight in certain pediatric groups. Nevertheless, the impact of interventions to address the epidemic in the dental setting has not been investigated. As part of a health care team, dental students should be exposed to the changing demographics and sequelae of overweight in children.

Dr. Pinto is Assistant Professor of Oral Medicine and Director, Oral Medicine Clinic; Ms. Kim is a D.M.D. Candidate and Research Assistant; Dr. Wadenya is Assistant Professor of Pediatric Dentistry; and Dr. Rosenberg is Associate Professor of Pediatric Dentistry—all at the University of Pennsylvania School of Dental Medicine. Direct correspondence and requests for reprints to Dr. Andres Pinto, The Robert Schattner Center, University of Pennsylvania, School of Dental Medicine, 240 S. 40th St., Suite 214, Philadelphia, PA 19104; 215-573-2440 phone; 215-573-7853 fax; apinto@dental.upenn.edu.

Key words: overweight, pediatrics, oral health, epidemic, children

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Excessive weight in children is a major public health concern. The number of affected individuals is increasing, and the health consequences of pediatric obesity into adulthood are only now being perceived.[1] Weight status in children is measured by assessment of body mass index (BMI) corresponding to gender and age-ranked percentages. Children are considered at risk of being overweight if they are between the 85th and 95th percentile of age and gender-related BMI and are considered overweight if they are at or beyond the 95th percentile of age and gender-related BMI according to Centers for Disease Control and Prevention (CDC) guidelines.[1] For example, an eight-year-old boy with a BMI of 19 is classified in the at-risk-of-being-overweight category (less than 95th percentile BMI adjusted by age and gender), while a six-and-a-half-year-old boy with the same BMI is considered overweight (at or beyond the 95th percentile). Children classified in the overweight category are considered obese.

The number of overweight children has almost tripled in the United States from 1980 to 2002.[1-4] Moreover, the prevalence of overweight children doubled in the six to eleven year age group and tripled among twelve to seventeen year olds in the last twenty years.[2] This phenomenon is not confined to the United States but affects children worldwide. Longitudinal data from Europe have identified children as being at a greater risk of being overweight than the rest of the population.[5] Additional studies have reported that more than half of overweight children between the ages of five and ten are at risk for cardiovascular disease, compared to less than 10 percent of normal-weight children.[6] Furthermore, children who are at risk for being overweight during preschool years carry a greater probability of being overweight by age twelve.[7]

Diet plays an important role in the obesity epidemic, as dietary habits in children have suffered major changes in the last thirty years.[8] Consumption of soft drinks is associated with reduced vitamin and mineral intake and an excess of dietary carbohydrates. The oral health implications of nutritional practices were demonstrated by a review of children's eating habits in the United States between 1988 and 1994.[9] The authors of that study found an association between poor dietary practices (meal fragmentation, missed breakfast, low fruit, and higher carbohydrate intake) and caries.

Current research in dental medicine trends towards exploring the link between oral health and systemic health, an effective way of underscoring the public health impact of oral care and influencing health care policy. Active participation of health care providers is critical to the success of obesity prevention strategies. Previous studies have heightened the awareness of dentists about the connection between obesity and oral health in the young.[10,11] An association between dental caries and weight in children has been proposed by preliminary and population-based studies,[12-14] although stronger evidence exists for the association between periodontal health and weight in adults.

In summary, given the strong evidence supporting the association of dental caries with irregular dietary patterns and quality[9] and the fact that abnormal dietary intake has been linked to the development of obesity at a young age,[8] a link between dental caries and weight is biologically plausible. The challenge in exploring this relationship lies in measuring possible confounders (e.g., diet, socioeconomic status) or effect modifiers (e.g., age, oral hygiene, fluoridation) in a standardized and comprehensive manner.

Dental students should be exposed to the complications associated with pediatric obesity and the role of dental professionals in addressing the prevention of obesity in children.[11] There is scant information on the prevalence of overweight children in the dental school setting, so prospective controlled studies on weight and oral health are needed. The aim of this pilot study was to evaluate the association between weight and dental caries in a random prospective cohort of children at their initial visit to an urban dental school.

Materials and Methods

The University of Pennsylvania School of Dental Medicine is located in West Philadelphia and forms part of the University of Pennsylvania campus. Patients attending the pediatric dental clinic at the school are predominantly African American, corresponding to local area demographics. This clinic is student-staffed, and more than thirty children are treated daily. The primary aim of the study was to explore the association between dental caries and weight in a prospective cohort of pediatric subjects attending this clinic for their initial visit. The secondary aim was to observe the period prevalence (four months) of pediatric obesity in this cohort. Our hypothesis was that there was a significant association between obesity and the presence of untreated dental caries among new pediatric patients attending the dental school clinic. Moreover, from the previously reported linkage between obesity and nutrition patterns and the presumed link between caries and nutrition,[9] we expected to find an association between weight and caries.

The study protocol was approved by the Institutional Review Board, Office of Human Research of the University of Pennsylvania. Based on a nationally representative sample of children, the prevalence of obesity in African American children ages six to eleven has been calculated to be 19.5 percent.[15,16] We expected that at least 15 percent of our population would have indicators of caries. With a double tailed alpha of .05 and a power of 80 percent, a minimum number of 135 children needed to be recruited for this study. This number of subjects would detect a relative risk of two (risk of poor oral health in overweight subjects). Sample size was calculated using PS Sample Size and Power Calculation software (Dupont and Plummer, Vanderbilt University) version 2.1.31.

In assessing oral health status, the decayed surfaces (Ds/ds) index was used. All exams were performed by one of two calibrated examiners who were trained in the assessment of the Ds/ds prior to study initiation. After an initial period of observation and training in caries detection, fifteen children participated in a pilot to calculate inter-observer reliability. Weighted Kappa coefficient in this pilot phase was 0.72, indicating good agreement among examiners. Assessment and classification of BMI were performed following established guidelines.[1]

A total of 142 subjects visiting the pediatric dental clinic for the first time were randomly selected using a computer-generated table (two subjects were selected per clinic session, total of two sessions per day) and asked to participate in the study. Subjects had not been solicited to become patients of the dental school. All but seven parents/guardians or children agreed to participate in the study. Subjects were representative of the pediatric population in West Philadelphia, as the entire sample resided within this area.

Anthropometric measurements were taken prior to dental exams by one investigator. Weight was assessed using a single calibrated scale (Tanita Ultimate series 2204®, Tanita Corporation Inc., IL). Height was measured using a stadiometer by having the subject standing straight without shoes. Body mass index was calculated using the following formula: Kg/(height in meters) squared.[1,2] A second investigator, blinded to the anthropometric measures, proceeded to record the Ds/ds index in a separate operatory. Subjects were then substratified into at-risk-of-being-overweight and overweight categories. All data were collected on standardized forms, and a database (Microsoft Access®) was created with all collected information, including age and gender. To protect confidentiality, the database was password secured and only accessible to one data analyst.

Descriptive summary statistics were obtained for all demographic and outcome variables. To assess the overall relationship between caries and overweight, a bivariate scatterplot, Spearman Rho correlation, and simple regression were calculated. Multivariate regression included age, gender, ethnicity, and BMI as predictors and caries as outcome. Analysis was performed using Medcalc 9.0.1.0. statistics software (Medcalc®, Belgium). Chi square analysis was used to compare outcomes in the at-risk-of-being-overweight and normal weight groups and the overweight and normal weight groups.

Table 1. Sample characteristics

Age:	Mean 8.7 (SD ±2.37) (95% CI 8.3-9.1)
Gender:	67 females mean age 8.7 68 males mean age 8.6
Ethnicity:	Asian 6 Caucasian 12 Hispanic 4 Middle Eastern 3 African American 110
Mean Weight:	35.6 kg (95% CI 33.2-38.1)
Mean Height:	136.3 cm
Mean BMI:	18.36 kg/m2 (SD ±3.5) Females: 19.24 kg/m2 Males: 16.1 kg/m2
Mean number of teeth:	23.7 (SD ±2.8)
Mean Ds score: **(entire cohort)**	2.06% (95% CI 1.4-2.7) 16%: 2 subjects 14%: 1 subject 10%: 3 subjects

Results

Sample demographics can be seen in Table 1. Subjects fell within the eight to nine year age range, with an almost symmetric gender distribution. The majority (81.48 percent) of subjects were African American. Approximately 12 percent of subjects fell into the at-risk-of-being-overweight category, and 15 percent were considered overweight. This number represents a slightly lower prevalence of obesity in this cohort than the reported national averages when compared to a predominantly African American group. Most subjects had clinically detectable caries, albeit affecting a very limited number of surfaces per subject. The overall prevalence of caries was low, with the exception of several outliers. Due to non-normal data distribution, nonparametric analyses were done. Spearman's correlation between Ds/ds and BMI was not significant ($p=0.99$). (See Figure 1.) Linear and multivariate modeling including demographic and descriptive variables (age, gender, ethnicity) only retained age in the model. Linear regression excluding significant outliers also did not yield significant results ($p=0.12$), and subgroup analysis dichotomizing subjects either at risk for overweight or overweight did not reach statistical significance ($p>0.05$).

Discussion

Dental caries is a multifactorial infectious disease.[17] Factors affecting the onset of carious lesions include oral hygiene, diet composition and frequency, socioeconomic status, salivary immunoglobulins, bacterial load, and fluoride intake.[18] This milieu makes the study of dental caries a daunting task. Recent evidence has shed light on the importance of oral health in the management of systemic health,

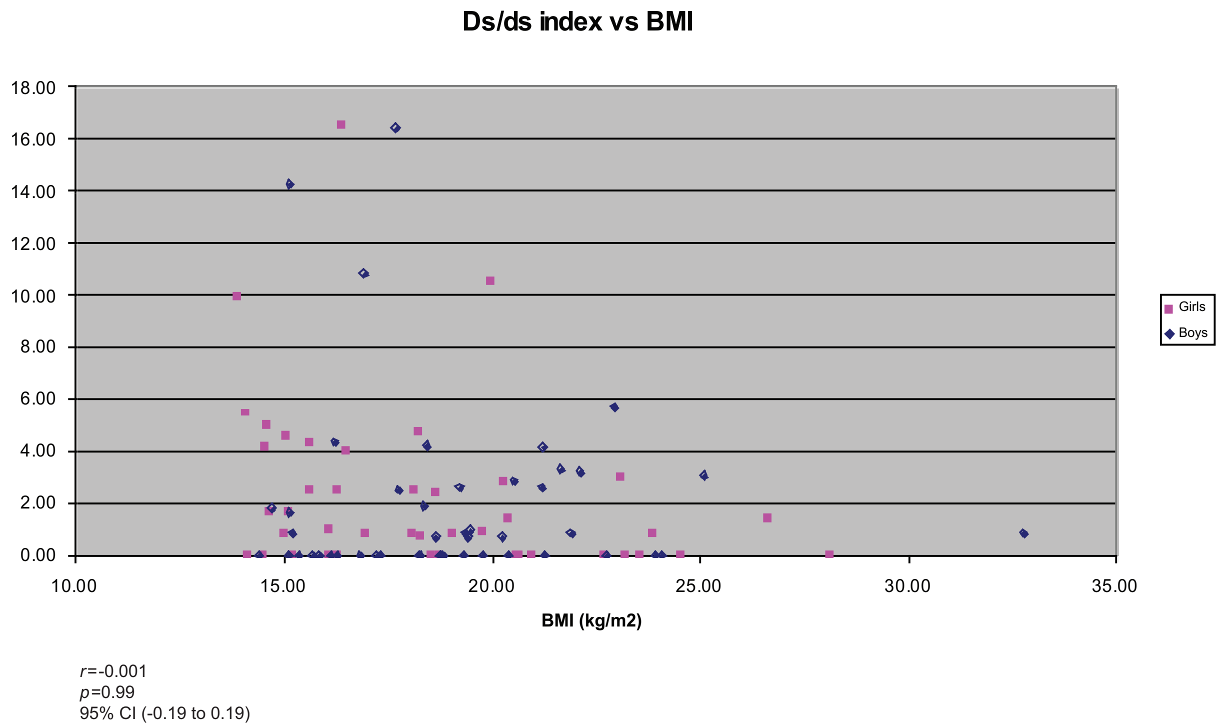

Figure 1. Data distribution and Spearman's correlation

and a myriad of diseases have been linked to indicators of oral disease.[19] Caries, in particular, has been linked to syndromes causing xerostomia, endocrine pathology, and medication intake.[20]

Obesity is characterized by energy and metabolism imbalance and is responsible for the onset of multiple health complications.[21,22] Among the most pertinent conditions caused by excessive weight is metabolic syndrome (characterized by the presence of insulin resistance, hypertension, abnormal lipid profile, and obesity), a relevant risk factor for cardiovascular disease.[23] More than half of severely overweight children have clinical and laboratory characteristics of metabolic syndrome.[23,24]

The early onset of diabetes in the young is changing the epidemiology and natural history of this disease. Diabetes in children heralds the development of severe kidney failure, more so than in late or adult onset disease.[23] Other organ systems affected by pediatric overweight are respiratory (development of obstructive apnea), gastrointestinal (fatty hepatic steatosis), musculoskeletal, and endocrine.[22]

Exploration of the link between weight and oral health in children has been controversial. A recent study in elementary school children in Germany (n=1290) found a positive correlation between weight and caries experience in primary and mixed dentitions.[25] Other studies, however, have not found any association.[26,27] Several reports, including ours, describe an inverse relationship between dental caries and weight.[28,29] The nature of the hypothesized protective effect of weight on dental caries in the permanent dentition is still obscure, as other factors influencing this relationship have not been measured. A recent article describes an association between BMI and accelerated dental development in a sample of 104 children.[30] The significance of such a finding has to be evaluated in light of future reports that will replicate this conclusion. In addition, a recent systematic review only identified one study as having a sufficient level of evidence to substantiate a positive correlation between dental caries and weight in a pediatric cohort.[29] Most of the published literature is characterized by a retrospective design and represents diverse populations. Furthermore, other measures of body fat distribution, such as waist circumference and waist to hip ratio, have not been reliably included in these analyses. In other research, our team has conducted a prospective cohort study that reports the utility of these measures in the pediatric population. The current literature on this topic, with few exceptions, is fraught with issues regarding study design, sample size, and generalizability of findings.

Limitations

This study is limited by sample size and external validity, which was challenged by the demographic characteristics (mostly African American) of the sample. We attempted to minimize sampling bias by randomly selecting patients to approach for the study. As a result, we do consider that this cohort represented the local pediatric population. All subjects were new patients at the dental school, and we excluded subjects who were having dental discomfort or seeking emergency care. In addition, all subjects had similar dental insurance coverage. The Ds/ds index represents a cross-sectional approach to the evaluation of caries, whereas other indices may better reflect past caries experience. The low prevalence of caries found in this sample could have biased the results towards a negative correlation and can be partially explained by the active water fluoridation in the city of Philadelphia. In addition, parents in this group could have represented health-seeking parents who are more involved in monitoring and enforcing their children's oral hygiene practices.

Obesity is commonly stigmatizing for young individuals and their families, which could have affected the enrollment of the seven parents who refused to provide consent to participate in the study. Although we did not perform a formal socioeconomic assessment of our sample, the well-characterized geographic localization of our subjects and known characteristics of the area, in our view, provided homogeneity to the group.

Conclusion

Notwithstanding the fact that the results of this preliminary study do not support an association between dental caries and obesity, future longitudinal research should incorporate validated dietary assessments, socioeconomic status, oral hygiene compliance, and other factors that may act as confounders or effect modifiers. Study of dental caries at an individual level must account for these variables.

It is critical for dental students to be exposed to the epidemiology of obesity in children, as many of these children will require significant dental care modifications for safe provision of care. As obesity results in many health complications, association with oral health parameters seems plausible, albeit not supported by the current evidence.

Even if a link between oral health and weight in children is not clear, our obligation as health care providers is to seek creative methods by which we can effect change in our pediatric patients. We also suggest that BMI calculation should be included in the standard medical evaluation of any pediatric patient, as it can provide a screen for potential health complications of the growing child. The impact of weight in total health should also be emphasized within dental school curricula. Presently, many complications deriving from obesity may form part of the pathology, physiology, or diagnostic sciences courses. We consider that a more global approach to the obesity epidemic should form part of the education of our future colleagues, as they will come into practice in a world with many changing trends.

The effect of interventions targeting obesity in primary dental settings has not been evaluated. Exploring the role of the dentist as screener and active member of overweight policy presents an exciting area for future research and practice.[31]

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Ejercicio 2 (Evaluación continua)

Traer el artículo señalado por la profesora. Se hará un ejercicio práctico en aula con dicho artículo. Traer el material de apoyo impreso que considere necesario. **Deberá traer una hoja de examen** (no se aceptan evaluaciones en otro tipo de hoja).

UNIDAD I (continuación)

Objetivo 1. 2. Identificar las estrategias de lectura adecuadas para la sección de resultados y discusión en un artículo científico.

Contenido:

Lectura de la sección de resultados en un artículo de investigación:

-Vocabulario

-Simbología

Previo a la clase

1. Leer los materiales titulados "Reviewer's quick guide to common statistical errors in scientific papers" y "Twenty Statistical Errors EvenYOUCan Find in Biomedical Research Articles".
2. Investigar algunos símbolos y términos estadísticos que suelen aparecen en la sección de resultados de los artículos que está leyendo para su proyecto.

En clase

1. Discutir en clase sobre los principales errores que se encuentran en el uso de estadística en artículos científicos y qué efectos podrían tener los mismos en el lector.

2. Traducir los siguientes extractos de artículos científicos e indicar qué se puede inferir de los mismos:

Reviewer's quick guide to common statistical errors in scientific papers

Design errors

Sample size for human subjects
Many studies are too small to detect even large effects (Table 1).

Table 1: Guide to sample size

Expected difference (p_1-p_2)	Total sample size required*
5%	1450-3200
10%	440-820
20%	140-210
30%	80-100
40%	50-60

* 5% significance level, 80% power. Smaller numbers may be justified for rare outcomes (p_1 <.1)

Look for:

- Clinical trials should always report sample size calculations
- Authors with 'negative' results (i.e. found no difference) should not report equivalence unless sufficiently powered -"absence of evidence is not evidence of absence"

Bias
Randomisation is the best way of avoiding bias but it is not always possible or appropriate.

Some biases affecting observational studies:

Treatment-by-indication bias: different treatments are given to different groups of patients because of differences in their clinical condition.

Historical controls: will tend to exaggerate treatment effect as recent patients benefit from improvements in health care over time and special attention as a study participant. Recent patients are also likely to be more restrictively selected.

Retrospective data collection: availability and recording of events and patient characteristics may be related to the groups being compared.

Ecological fallacy: an association observed between variables on an aggregate level does not necessarily represent the association that exists at the individual level.

Some biases affecting observational studies and clinical trials:

Selection bias: low response rate or high refusal rate – were patients that participated different to those that did not?

Informative dropout – was follow-up curtailed for reasons connected to the primary outcome? If so, imbalance in dropout rates between the groups being compared will introduce bias.

Bias in clinical trials:

No-one should know what the next random allocation is going to be as this may affect whether or when the patient is entered into the trial. Using date of birth, hospital number, or simply alternating between treatments is therefore inappropriate. Central randomisation is ideal.

Unblinded assessment of outcomes may be influenced by knowledge of the treatment group.

Look for:

- Appreciation and measures taken to reduce bias through study design
- Selection of patients, collection of data, definition and assessment of outcome and, for clinical trials, method of randomisation should be clearly described
- Number and reasons for withdrawal should be reported by treatment group
- Appropriate analytic methods such as multiple regression should be used to adjust for differences between groups in observational studies
- Authors should discuss likely biases and potential impact on their results

Method comparison studies
If different methods are evaluated by different observers then the method differences are confounded with observer differences. The study must be repeated with each observer using all methods.

Analysis errors

Failure to use a test for trend on ordered categories (e.g. age-group).

Dichotomizing continuous variables in the analysis (acceptable for descriptive purposes).

Using methods for independent samples on paired or repeated measures data. An example is using both arms or legs of the same patient as if they were two independent observations.

Using parametric methods (e.g. t-test, ANOVA or linear regression) when the outcome or residuals have not been verified as normally distributed.

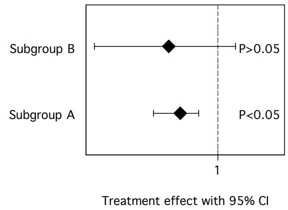
Over using hypothesis tests (P-values) in preference to confidence intervals.

One-tailed tests are very rarely appropriate.

Failing to analyse clinical trials by intention-to-treat.

Obscure statistical tests should be justified and referenced.

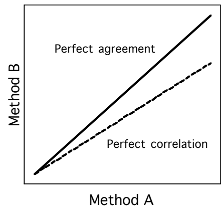
Comparing P-values between subgroups instead of carrying out tests of interaction is incorrect. Some may wrongly conclude from these results that:



the subgroup affects response to treatment, based on comparing P-values. A test of interaction would show no evidence of any effect of the grouping on response.

Correlating time series: any two variables that consistently rise, fall or remain constant over time will be correlated. 'Detrended' series should be compared instead.

Method comparison studies
Correlation ≠ agreement



Higher correlation can be induced by including patients with extreme measurements. Limits of agreement should be calculated according to method of Bland and Altman. Adequate agreement between methods is a clinical not a statistical judgement.

Multiple testing
Conclusions should only be drawn from appropriate analyses of a small number of clear, pre-defined hypotheses. Results from post-hoc subgroup or risk-factor analyses should be treated as speculative. If many such tests have been carried out adjustment for multiple testing should be considered.

Comparing groups at multiple time points should be avoided – a summary statistics approach or more complex statistical methods should be used instead.

Further reading:

CONSORT: http://www.consort-statement.org

Greenhalgh T. How to read a paper: Statistics for the non-statistician. I: Different types of data need different statistical tests. *BMJ* 1997;315:364-366

Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. *Lancet* 1986;1:307-310. Available online at http://www-users.york.ac.uk/~mb55/meas/ba.htm

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Sealed Envelope Ltd
http://www.sealedenvelope.com

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GUEST EDITORIAL

Twenty Statistical Errors Even *YOU* Can Find in Biomedical Research Articles

Tom Lang

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"Critical reviewers of the biomedical literature have consistently found that about half the articles that used statistical methods did so incorrectly." (1)

"Good research deserves to be presented well, and good presentation is as much a part of the research as the collection and analysis of the data. We recognize good writing when we see it; let us also recognize that science has the right to be written well." (2)

Statistical probability was first discussed in the medical literature in the 1930s (3). Since then, researchers in several fields of medicine have found high rates of statistical errors in large numbers of scientific articles, even in the best journals (4-7). The problem of poor statistical reporting is, in fact, longstanding, widespread, potentially serious, and not well known, despite the fact that most errors concern basic statistical concepts and can be easily avoided by following a few guidelines (8).

The problem of poor statistical reporting has received more attention with the growth of the evidence-based medicine movement. Evidence-based medicine is literature-based medicine and depends on the quality of published research. As a result, several groups have proposed reporting guidelines for different types of trials (9-11), and a comprehensive set of guidelines for reporting statistics in medicine has been compiled from an extensive review of the literature (12).

Here, I describe 20 common statistical reporting guidelines that can be followed by authors, editors, and reviewers who know little about statistical analysis. These guidelines are but the tip of the iceberg: readers wanting to know more about the iceberg should consult more detailed texts (12), as well as the references cited here. To keep the tension mounting in an often dull subject, the guidelines are presented in order of increasing importance.

The guidelines described here are taken from *How To Report Statistics in Medicine: Annotated Guidelines for Authors, Editors, and Reviewers*, by Thomas A. Lang and Michelle Secic (American College of Physicians, 1997).

Error #1: Reporting measurements with unnecessary precision

Most of us understand numbers with one or two significant digits more quickly and easily than numbers with three or more digits. Thus, rounding numbers to two significant digits improves communication (13). For instance, in the sentences below, the final population size is about three times the initial population size for both the women and the men, but this fact is only apparent after rounding:

– The number of women rose from 29,942 to 94,347 and the number of men rose from 13,410 to 36,051.

– The number of women rose from 29,900 to 94,300 and the number of men rose from 13,400 to 36,000.

– The number of women rose from about 30,000 to 94,000 and the number of men rose from about 13,000 to 36,000.

Many numbers do not need to be reported with full precision. If a patient weighs 60 kg, reporting the weight as 60.18 kg adds only confusion, even if the measurement was that precise. For the same reason, the smallest P value that need be reported is $P<0.001$.

Error #2: Dividing continuous data into ordinal categories without explaining why or how

To simplify statistical analyses, continuous data, such as height measured in centimeters, are often separated into two or more ordinal categories, such as short, normal, and tall. Reducing the level of measurement in this way also reduces the precision of the measurements, however, as well as reducing the variability in the data. Authors should explain why they chose to lose this precision. In addition, they should explain how the boundaries of the ordinal categories were determined, to avoid the appearance of bias (12). In some cases, the boundaries (or "cut points")

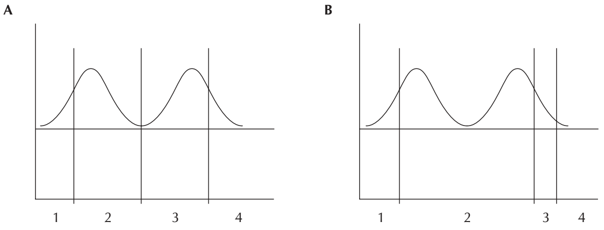

Figure 1. Authors should state why and how continuous data were separated into ordinal categories to avoid possible bias. **A.** For this distribution, these categories appear to have been reasonably created. **B.** The rationale for creating these categories should be explained.

that define the categories can be chosen to favor certain results (Fig. 1).

Error #3: Reporting group means for paired data without reporting within-pair changes

Data taken from the same patient are said to be "paired." In a group of patients with data recorded at two time points, differences can occur between the group means over time, as well between each individual's measurements over time. However, changes in the individuals' measurements may be hidden by reporting only the group means (Fig. 2). Unless the individual data are reported, readers may not know about conflicts between the two measures. The results in Figure 2, for example, can be reported as a mean *decrease* from time 1 to time 2 or as an *increase* in two of three patients. Both results are technically correct, but reporting only one can be misleading.

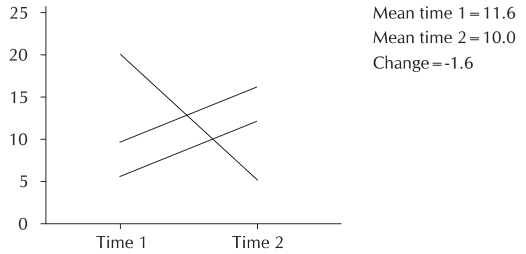

Figure 2. Paired data should be reported together so that the changes within each patient, as well as in group means, can be evaluated. Here, the results can be reported as a mean drop of 1.6 units or that units increased in 2 of 3 patients.

Error #4: Using descriptive statistics incorrectly

Two of the most common descriptive statistics for continuous data are the *mean* and *standard deviation*. However, these statistics correctly describe only a "normal" or "Gaussian" distribution of values. By definition, about 68% of the values of a normal distribution are within plus or minus 1 standard deviation of the mean, about 95% are within plus or minus 2 standard deviations, and about 99% are within plus or minus 3 standard deviations. In markedly non-normal distributions, these relationships are no longer true, so the mean and standard deviation do not communicate the shape of the distribution well. Instead, other measures, such as the *median* (the 50th percentile: the value dividing the data into an upper and a lower half) and *range* (usually reported by giving the minimum and maximum values) or *interquartile range* (usually reported by giving the 25th and the 75th percentiles) are recommended (14).

Although the mean and standard deviation can be calculated from as few as two data points, these statistics may not describe small samples well. In addition, most biological data are not normally distributed (15). For these reasons, the median and range or interquartile range should probably be far more common in the medical literature than the mean and standard deviation.

Error #5: Using the standard error of the mean (SEM) as a descriptive statistic or as a measure of precision for an estimate

The mean and standard deviation describe the center and variability of a normal distribution of a characteristic for a *sample*. The *mean* and *standard error of the mean (SEM),* however, are an estimate (the mean) and a measure of its precision (the SEM) for a characteristic of a *population*. However, the SEM is always smaller than the standard deviation, so it is sometimes reported instead of the standard deviation to make the measurements look more precise (16). Although the SEM is a measure of precision for an estimate (1 SEM on either side of the mean is essentially a 68% confidence interval), the preferred measure of precision in medicine is *the 95% confidence interval* (17). Thus, the mean and SEM can sometimes refer to a sample and sometimes to a population. To avoid confusion, the mean and standard deviation are the preferred summary statistics for (normally distributed) data, and the mean and 95% confidence interval are preferred for reporting an estimate and its measure of precision.

For example, if the mean weight of a sample of 100 men is 72 kg and the SD is 8 kg, then (assuming a normal distribution), about two-thirds of the men (68%) are expected to weigh between 64 kg and 80 kg. Here, the mean and SD are used correctly to describe this distribution of weights.

However, the mean weight of the sample, 72 kg, is also the best estimate of the mean weight of all men in the population from which the sample was drawn. Using the formula $SEM = SD/\sqrt{n}$, where SD = 8 kg and n = 100, the SEM is calculated to be 0.8. The interpretation here is that if similar (random) samples were repeatedly drawn from the same population of men, about 68% of these samples would be expected to have mean values between 71.2 kg and 72.8 kg (the range of values between *1 SEM* above and below the estimated mean).

The preferred expression for an *estimate and its precision* is the mean and the 95% confidence interval (the range of values about *2 SEMs* above and below the mean). In the example here, the expression would be "The mean value was 72 mg (95% CI = 70.4 to 73.6 mg)," meaning that if similar (random) samples were repeatedly drawn from the same population of men, about 95% of these samples would be expected to have mean values between 70.4 mg and 73.6 mg.

Error #6: Reporting only P values for results

P values are often misinterpreted (18). Even when interpreted correctly, however, they have some limitations. For main results, report the absolute difference between groups (relative or percent differences can be misleading) and the 95% confidence interval for the difference, instead of, or in addition to, P values. The sentences below go from poor to good reporting:

– *"The effect of the drug was statistically significant."* This sentence does not indicate the size of the effect, whether the effect is clinically important, or how statistically significant the effect is. Some readers would interpret "statistically significant" in this case to mean that the study supports the use of the drug.

– *"The effect of the drug on lowering diastolic blood pressure was statistically significant ($P < 0.05$)"* Here, the size of the drop is not given, so its clinical importance is not known. Also, *P* could be 0.049; statistically significant (at the 0.05 level) but so close to 0.05 that it should probably be interpreted similarly to a *P* value of, say, 0.51, which is not statistically significant. The use of an arbitrary cut point, such as 0.05, to distinguish between "significant" and "non significant" results is one of the problems of interpreting *P* values.

– *"The mean diastolic blood pressure of the treatment group dropped from 110 to 92 mm Hg ($P = 0.02$)."* This sentence is perhaps the most typical. The pre- and posttest values are given, but not the difference. The mean drop – the 18-mm Hg difference – is statistically significant, but it is also an estimate, and without a 95% confidence interval, the precision (and therefore the usefulness) of the estimate cannot be determined.

– *"The drug lowered diastolic blood pressure by a mean of 18 mm Hg, from 110 to 92 mm Hg (95% CI = 2 to 34 mm Hg; $P = 0.02$)."* The confidence interval indicates that if the drug were to be tested on 100 samples similar to the one reported, the average drop in blood pressure in 95 of those 100 samples would probably range between 2 and 34 mm Hg. A drop of only 2 mm Hg is not clinically important, but a drop of 34 mm Hg is. So, although the mean drop in blood pressures in this study was statistically significant, the expected difference in blood pressures in other studies may not always be clinically important; that is, the study is inconclusive.

When a study produces a confidence interval in which *all* the values are clinically important, the intervention is much more likely to be clinically effective. If *none* of the values in the interval are clinically important, the intervention is likely to be ineffective. If only some of the values are clinically important, the study probably did not enroll enough patients.

Error #7: Not confirming that the data met the assumptions of the statistical tests used to analyze them

There are hundreds of statistical tests, and several may be appropriate for a given analysis. However, tests may not give accurate results if their assumptions are not met (19). For this reason, both the name of the test and a statement that its assumptions were met should be included in reporting every statistical analysis. For example: "The data were approximately normally distributed and thus did not violate the assumptions of the *t* test."

The most common problems are:

– Using parametric tests when the data are not normally distributed (skewed). In particular, when comparing two groups, Student's *t* test is often used when the Wilcoxon rank-sum test (or another non-parametric test) is more appropriate.

– Using tests for independent samples on paired samples, which require tests for paired data. Again, Student's *t* test is often used when a paired *t* test is required.

Error #8: Using linear regression analysis without establishing that the relationship is, in fact, linear

As stated in Guideline #7, every scientific article that includes a statistical analysis should contain a sentence confirming that the assumptions on which the analysis is based were met (12). This confirmation is especially important in linear regression analysis, which assumes that the relationship between a response and an explanatory variable is linear. If this assumption is not met, the results of the analysis may be incorrect.

The assumption of linearity may be tested by graphing the "residuals": the difference between each data point and the regression line (Fig. 3). If this graph is flat and close to zero (Fig. 4A), the relationship is linear. If the graph shows any other pattern, the relationship is not linear (Fig. 4B, 4C, and 4D.) Testing the assumption of linearity is important because simply looking at graphed data can be misleading (Fig. 5).

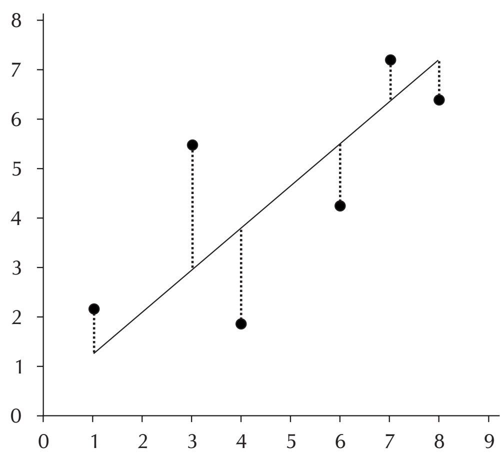

Figure 3. A residual is the distance between an actual, observed value and the value predicted by the regression line.

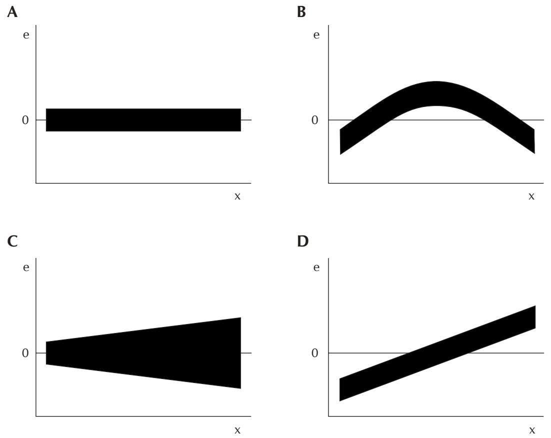

Figure 4. A. When the graphed residuals remain close to zero over the range of values, the regression line accurately represents the linear relationship of the data. Any other pattern (**B**, **C**, and **D**) indicates that the relationship is not linear, which means that linear regression analysis should not be used.

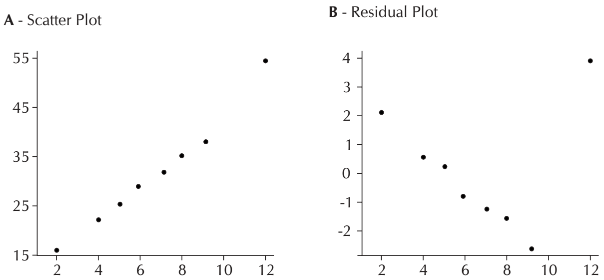

Figure 5. The appearance of linearity in a set of data can be deceptive. Here, a relationship that appears to be linear (**A**) is obviously not, as indicated by the graph of residuals (**B**).

Error #9: Not accounting for all data and all patients

Missing data is a common but irritating reporting problem made worse by the thought that the author is careless, lazy, or both (20). Missing data raise issues about:

– the nature of the missing data. Were extreme values not included in the analysis? Were data lost in a lab accident? Were data ignored because they did not support the hypothesis?

– the generalizability of the presented data. Is the range of values really the range? Is the drop-out rate really that low?

– the quality of entire study. If the totals don't match in the published article, how careful was the author during the rest of the research?

One of the most effective ways to account for all patients in a clinical trial is a flow chart or schematic summary (Fig. 6) (9,12,21). Such a visual summary can account for all patients at each stage of the trial, efficiently summarize the study design, and indicate the probable denominators for proportions, percentages, and rates. Such a graphic is recommended by the CONSORT Statement for reporting randomized trials (9).

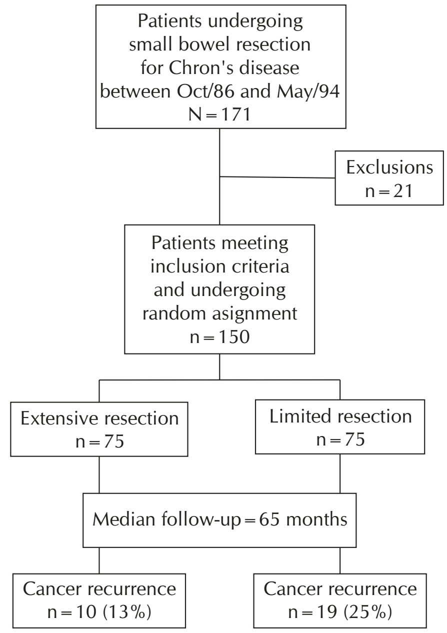

Figure 6. A flow chart of a randomized clinical trial with two treatment arms, showing the disposition of all patients at each stage of the study.

Error #10: Not reporting whether or how adjustments were made for multiple hypothesis tests

Most studies report several *P* values, which increases the risk of making a type I error: such as saying that a treatment is effective when chance is a more likely explanation for the results (22). For example, comparing each of six groups to all the others requires 15 "pair-wise" statistical tests – 15 *P* values. Without adjusting for these multiple tests, the chance of making a type I error rises from 5 times in 100 (the typical alpha level of 0.05) to 55 times in 100 (an alpha of 0.55).

The multiple testing problem may be encountered when (12):

– *establishing group equivalence* by testing each of several baseline characteristics for differences between groups (hoping to find none);

– performing *multiple pair-wise comparisons*, which occurs when three or more groups of data are compared two at a time in separate analyses;

– testing *multiple endpoints* that are influenced by the same set of explanatory variables;

– performing *secondary analyses* of relationships observed during the study but not identified in the original study design;

– performing *subgroup analyses* not planned in the original study;

– performing *interim analyses of accumulating data* (one endpoint measured at several different times).

– *comparing groups at multiple time points* with a series of individual group comparisons.

Multiple testing is often desirable, and exploratory analyses should be reported as exploratory. "Data dredging," however – undisclosed analyses involving computing many *P* values to find *something* that is statistically significant (and therefore worth reporting) – is considered to be poor research.

Error #11: Unnecessarily reporting baseline statistical comparisons in randomized trials

In a true randomized trial, each patient has a known and usually equal probability of being assigned to either the treatment or the control group. Thus, any differences between groups at baseline are, by definition, the result of chance. Therefore, significant differences in baseline data (Table 1) do not indicate bias (as they might in other research designs) (9). Such comparisons may indicate statistical imbalances between the groups that may need to be taken into account later in the analysis, but the P values do not need to be reported (9).

Table 1. Statistical baseline comparisons in a randomized trial. By chance, the groups differ in median albumin scores ($P=0.03$); the difference does not indicate selection bias. Here, *P* values need not be reported for this reason

Variable	Control (n=43)	Treatment (n=51)	Difference	P
Median age (years)	85	84	1	0.88
Men (n, %)	21 (49)	21 (51)	3%	0.99
Median albumin (g/L)	30.0	33.0	3.0 g/L	0.03
Diabetes (n,%)	11 (26)	8 (20)	6%	0.83

Assuming that alpha is set at 0.05, of every 100 baseline comparisons in randomized trials, 5 should be statistically significant, just by chance. However, one study found that among 1,076 baseline comparisons in 125 trials, only 2% were significant at the 0.05 level (23).

Error #12: Not defining "normal" or "abnormal" when reporting diagnostic test results

The importance of either a positive or a negative diagnostic test result depends on how "normal" and "abnormal" are defined. In fact, "normal" has at least six definitions in medicine (24):

– A *diagnostic definition* of normal is based on the range of measurements over which the disease is absent and beyond which it is likely to be present. Such a definition of normal is desirable because it is clinically useful.

– A *therapeutic definition* of normal is based on the range of measurements over which a therapy is not indicated and beyond which it is beneficial. Again, this definition is clinically useful.

Other definitions of normal are perhaps less useful for patient care, although they are unfortunately common:

– A *risk factor definition* of normal includes the range of measurements over which the risk of disease is not increased and beyond which the risk is increased. This definition assumes that altering the risk factor alters the actual risk of disease. For example, with rare exceptions, high serum cholesterol is not itself dangerous; only the associated increased risk of heart disease makes a high level "abnormal."

– A *statistical definition* of normal is based on measurements taken from a disease-free population. This definition usually assumes that the test results are "normally distributed"; that they form a "bell-shaped" curve. The normal range is the range of measurements that includes two standard deviations above and below the mean; that is, the range that includes the central 95% of all the measurements. However, the highest 2.5% and the lowest 2.5% of the scores – the "abnormal" scores – have no clinical meaning; they are simply uncommon. Unfortunately, many test results are not normally distributed.

– A *percentile definition* of normal expresses the normal range as the lower (or upper) percentage of the total range. For example, any value in the lower, say, 95% of all test results may be defined as "normal," and only the upper 5% may be defined as "abnormal." Again, this definition is based on the frequency of values and may have no clinical meaning.

– A *social definition* of normal is based on popular beliefs about what is normal. Desirable weight or the ability of a child to walk by a certain age, for example, often have social definitions of "normal" that may or may not be medically important.

Error #13: Not explaining how uncertain (equivocal) diagnostic test results were treated when calculating the test's characteristics (such as sensitivity and specificity)

Not all diagnostic tests give clear positive or negative results. Perhaps not all of the barium dye was taken; perhaps the bronchoscopy neither ruled out nor confirmed the diagnosis; perhaps observers could not agree on the interpretation of clinical signs. Reporting the number and proportion of non-positive and non-negative results is important because such results affect the clinical usefulness of the test.

Uncertain test results may be one of three types (25):

– *Intermediate results* are those that fall between a negative result and a positive result. In a tissue test based on the presence of cells that stain blue, "bluish" cells that are neither unstained nor the required shade of blue might be considered intermediate results.

– *Indeterminate results* are results that indicate neither a positive nor a negative finding. For example, responses on a psychological test may not determine whether the respondent is or is not alcohol-dependent.

– *Uninterpretable results* are produced when a test is not conducted according to specified performance standards. Glucose levels from patients who did not fast overnight may be uninterpretable, for example.

How such results were counted when calculating sensitivity and specificity should be reported. Test characteristics will vary, depending on whether the results are counted as positive or negative or were not counted at all, which is often the case. The standard 2×2 table for computing diagnostic sensitivity and specificity does not include rows and columns for uncertain results (Table 2). Even a highly sensitive or specific test may be of little value if the results are uncertain much of the time.

Table 2. Standard table for computing diagnostic test characteristics*

	Disease		
Test result	present	absent	Totals
Positive	a	b	a + b
Negative	c	d	c + d
Total	a + c	b + d	a + b + c + d

*Sensitivity = a/a + c; specificity = d/b + d. Likelihood ratios can also be calculated from the table. The table does not consider uncertain results, which often – and inappropriately – are ignored.

Error #14: Using figures and tables only to "store" data, rather than to assist readers

Tables and figures have great value in storing, analyzing, and interpreting data. In scientific presentations, however, they should be used to *communicate information*, not simply to "store" data (26). As a result, published tables and figures may differ from those created to record data or to analyze the results. For example, a table presenting data for 3 variables may take any of 8 forms (Table 3). Because numbers are most easily compared side-by-side, the most appropriate form in Table 3 is the one in which the variables to be compared are side-by-side. That is, by putting the variables to be compared side-by-side, we encourage readers to make a specific comparison.

The table and images in Figure 7 show the same data: the prevalence of a disease in nine areas. How-

A. Prevalence, by area

Area	Rate (%)
1	23
2	0
3	17
4	11
5	22
6	5
7	21
8	12
9	16

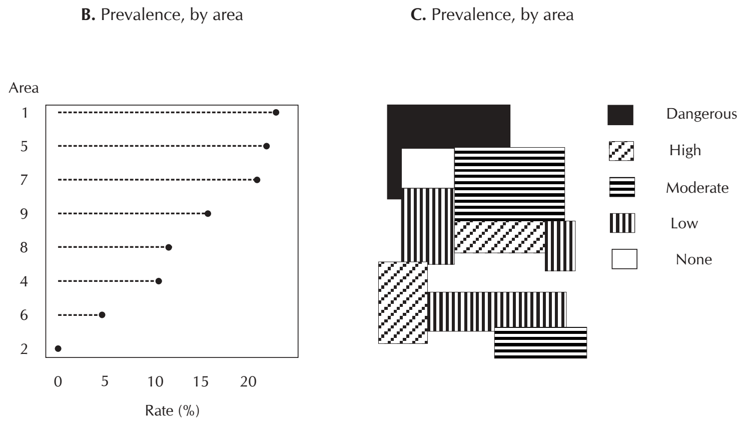

Figure 7. Tables and figures should be used to communicate information, not simply to store data. **A.** Tables are best for communicating or referencing precise numerical data. **B.** Dot charts are best for communicating general patterns and comparisons. **C.** Maps are best for communicating spatial relationships.

Table 3. A table for reporting 3 variables (nationality, sex, and age group) may take any of 8 forms:

Form 1

	Men		Women	
Age (years)	US	China	US	China
0-21				
22-49				
50+				

Form 2

	China		US	
Age (years)	men	women	men	women
0-21				
22-49				
50+				

Form 3

	0-21 years		22-49 years		50+ years	
	men	women	men	women	men	women
US						
China						

Form 4

	Men (age, years)			Women (age, years)		
	0-21	22-49	50+	0-21	22-49	50+
US						
China						

Form 5

	0-21 years		22-49 years		50+ years	
	US	China	US	China	US	China
Men						
Women						

Form 6

	US (age, years)			China (age, years)		
	0-21	22-49	50+	0-21	22-49	50+
Men						
Women						

Form 7

	0-21 years	22-49 years	50+ years
Men:			
US			
China			
Women:			
US			
China			

Form 8

	0-21 years	22-49 years	50+ years
US:			
men			
women			
China:			
men			
women			

ever, the table is best used to communicate and to reference precise data; the dot chart, to communicate how the areas compare with one another; and the map, to communicate the spatial relationships between the areas and disease prevalence.

Error #15: Using a chart or graph in which the visual message does not support the message of the data on which it is based

We remember the visual message of an image more than the message of the data on which it is based (27). For this reason, the image should be adjusted until its message is the same as that of the data. In the "lost zero" problem (Fig. 8A), column 1 appears to be less than half as long as column 2. However, the chart is misleading because the columns do not start at zero: the zero has been "lost." The more accurate chart, showing the baseline value of zero (Fig. 8B), shows that column 1 is really two-thirds as long as column 2. To prevent this error, the Y axis should be "broken" to indicate that the columns do not start at zero (Fig. 8C).

In the "elastic scales" problem, one of the axes is compressed or lengthened disproportionately with respect to the other, which can distort the relationship between the two axes (Fig. 9). Similarly, in the "double scale" problem, unless the scale on the right has some mathematical relationship with the scale on the left, the relationship between two lines can be distorted (Fig. 10).

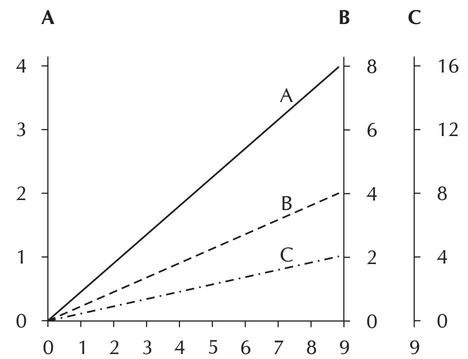

Figure 10. Charts with two scales, each for a different line of data, can imply a false relationship between the lines, depending on how the scales are presented. Lines A, B, and C represent the same data, but their visual relationships depend on how their respective scales are drawn. Here, Line B seems to increase at half the rate of Line A, whereas Line C seems to increase at a quarter of the rate. Unless the vertical scales are mathematically related, the relationship between the lines can be distorted simply by changing one of the scales.

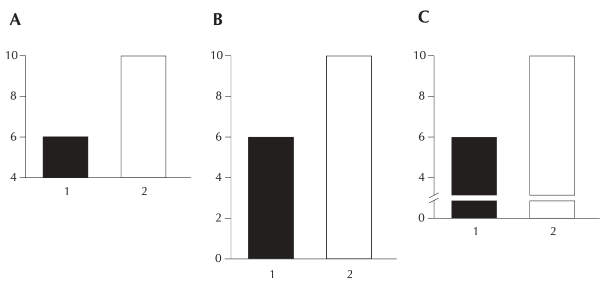

Figure 8. A. Charts and graphs that do not begin at zero can create misleading visual comparisons. **B.** Here, the actual length of both columns can be compared accurately. **C.** When space prohibits starting with zero as a baseline, the axis should be "broken" to indicate that the baseline is not zero.

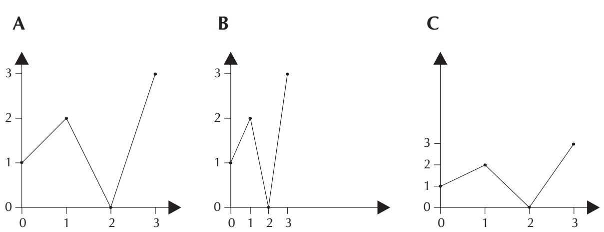

Figure 9. Uneven scales can visually distort relationships among trends. Compressing the scale of the X axis (representing time in this example) makes changes seem more sudden. Compressing the scale of the Y axis makes the changes seem more gradual. Scales with equal intervals are preferred.

Error #16: Confusing the "units of observation" when reporting and interpreting results

The "unit of observation" is what is actually being studied. Problems occur when the unit is something other than the patient. For example, in a study of 50 eyes, how many patients are involved? What does a 50% success rate mean?

If the unit of observation is the heart attack, a study of 18 heart attacks among 1,000 people has a sample size of 18, not 1,000. The fact that 18 of 1,000 people had heart attacks may be important, but there are still only 18 heart attacks to study.

If the outcome of a diagnostic test is a judgment, a study of the test might require testing a sample of judges, not simply a sample of test results to be judged. If so, the number of judges involved would constitute the sample size, rather than the number of test results to be judged.

Error #17: Interpreting studies with nonsignificant results and low statistical power as "negative," when they are, in fact, inconclusive

Statistical power is the ability to detect a difference of a given size, if such a difference really exists in the population of interest. In studies with low statistical power, results that are not statistically significant are not negative, they are inconclusive: "The absence of proof is not proof of absence." Unfortunately, many studies reporting non-statistically significant findings are "under-powered" and are therefore of little value because they do not provide conclusive answers (28).

In some situation, non-statistically significant findings are desirable, as when groups in observational studies are compared with hypothesis tests (*P* values) at baseline to establish that they are similar. Such comparisons often have low power and therefore may not establish that the groups are, in fact, similar.

Error #18: Not distinguishing between "pragmatic" (effectiveness) and "explanatory" (efficacy) studies when designing and interpreting biomedical research

Explanatory or *efficacy studies* are done *to understand* a disease or therapeutic process. Such studies are best done under "ideal" or "laboratory" conditions that allow tight control over patient selection, treatment, and follow up. Such studies may provide insight into biological mechanisms, but they may not be generalizable to clinical practice, where the conditions are not so tightly controlled. For example, a double-masked explanatory study of a diagnostic test may be appropriate for evaluating the scientific basis of the test. However, in practice, doctors are not masked to information about their patients, so the study may not be realistic.

Pragmatic or *effectiveness studies* are performed to *guide decision-making.* These studies are usually conducted under "normal" conditions that reflect the circumstances under which medical care is usually provided. The results of such studies may be affected by many, uncontrolled, factors, which limits their explanatory power but that may enhance their application in clinical practice. For example, patients in a pragmatic trial are more likely to have a wide range of personal and clinical characteristics than are patients in an explanatory trial, who must usually meet strict entrance criteria.

Many studies try to take both approaches and, as a result, do neither well (29,30). The results of a study should be interpreted in light of the nature of the question it was designed to investigate (Table 4).

Table 4. Differences between explanatory and pragmatic studies in studies of zinc lozenges for treating the common cold. The pragmatic study was designed to determine whether zinc lozenges would reduce the number and duration of cold symptoms in outpatients and was conducted under conditions faced by consumers of the lozenges. The explanatory study was designed to determine whether zinc is an effective antiviral agent and was conducted under much tighter experimental conditions

Variable	Explanatory	Pragmatic
Diagnosis	positive *Rhinovirus* culture	3 of 10 symptoms
Evidence of efficacy (outcomes)	weight of nasal mucus, tissue counts	reduced number and duration of symptoms
Setting	in-patient	out-patient
Intervention	controlled by researcher	controlled by patient
Design	masked and placebo-controlled	masked and placebo-controlled
Focus	zinc as an antiviral agent	zinc as a treatment for colds

Error #19: Not reporting results in clinically useful units

The reports below (31,32) all use accurate and accepted outcome measures, but each leaves a different impression of the effectiveness of the drug. *Effort-to-yield measures,* especially *the number needed to treat,* are more clinically relevant and allow different treatments to be compared on similar terms.

– *Results expressed in absolute terms.* In the Helsinki study of hypercholesterolemic men, after 5 years, 84 of 2,030 patients on placebo (4.1%) had heart attacks, whereas only 56 of 2,051 men treated with gemfibrozil (2.7%) had heart attacks ($P<0.02$), for an *absolute risk reduction* of 1.4% (4.1-2.7% = 1.4%).

– *Results expressed in relative terms.* In the Helsinki study of hypercholesterolemic men, after 5 years, 4.1% of the men treated with placebo had heart attacks, whereas only 2.7% treated with gemfibrozil had heart attacks. The difference, 1.4%, represents a 34% *relative risk reduction* in the incidence of heart attack in the gemfibrozil-treated group (1.4%/4.1% = 34%).

– *Results expressed in an effort-to-yield measure, the number needed to treat.* The results of the Helsinki study of 4,081 hypercholesterolemic men indicate that 71 men would need to be treated for 5 years to prevent a single heart attack.

– *Results expressed in another effort-to-yield measure.* In the Helsinki study of 4,081 hypercholesterolemic men, after 5 years, the results indicate that about 200,000 doses of gemfibrozil were taken for each heart attack prevented.

– *Results expressed as total cohort* mortality *rates.* In the Helsinki study, *total mortality from cardiac events* was 6 in the gemfibrozil group and 10 in the control group, for an absolute risk reduction of 0.2%, a relative risk reduction of 40%, and the need to treat 2,460 men for 1 year to prevent 1 death from heart attack.

Error #20: Confusing statistical significance with clinical importance

In statistics, *small differences between large groups* can be statistically significant but clinically meaningless (12,33). In a study of the time-to-failure for two types of pacemaker leads, a mean difference of 0.25 months over 5 years among thousands of leads is not apt to be clinically important, even if such a difference would have occurred by chance less than 1 time 1,000 ($p<0.001$).

It is also true that *large differences between small groups* can be clinically important but not statistically significant. In a small study of patients with a terminal condition, if even one patient in the treatment group survives, the survival is clinically important, whether or not the survival rate is statistically different from that of the control group.

Conclusion

The real solution to poor statistical reporting will come when authors learn more about research design and statistics; when statisticians improve their ability to communicate statistics to authors, editors, and readers; when researchers begin to involve statisticians at the beginning of research, not at its end; when manuscript editors begin to understand and to apply statistical reporting guidelines (12,18,19,34-40); when more journals are able to screen more carefully more articles containing statistical analyses; and when readers learn more about how to interpret statistics and begin to expect, if not demand, adequate statistical reporting.

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a. Angle and maxillary gingival display were significant at *P* <.05 levels.

b. The mean age of the patients was 42.8 (SD 11.4) and of the controls 39.9 years (SD 10.4).

c. The patients had 1 to 18 (mean 7.5; SD 4.3) and the controls 1 to 16 amalgam fillings (mean 7.8; SD 3.8).

d. No differences were found in the remeasurements (*P* < .05).

Luego de clase

Tomando como referencia artículos en inglés realizados con su tema de investigación, hacer una lectura crítica de algunos de ellos a fin de verificar el uso correcto de la estadística.

UNIDAD II

Objetivo 2.1 Extraer información específica para su inclusión del marco teórico de una investigación.

Contenido

- Uso de las siguientes estrategias de lectura:

Inferencia del contexto, sinónimos y palabras clave

Previo a la clase

1. Leer los textos titulados: “Strengthening your reading Comprehension” y “Making inferences and drawing conclusions”.

En clase

1. Discutir acerca de las diferentes estrategias de lectura estudiadas hasta ahora.
2. Repasar el uso de las diferentes estrategias de lectura en ejercicios prácticos en el aula.

Luego de clase

1. Extraer información específica de diferentes textos para incluir en su proyecto de investigación.

CUESTA COLLEGE
SAN LUIS OBISPO COUNTY COMMUNITY COLLEGE DISTRICT

Strengthening your reading Comprehension

HOW TO STRENGTHEN YOUR READING COMPREHENSION

1. **Analyze the time and place in which you are reading -** If you've been reading or studying for several hours, mental fatigue may be the source of the problem. If you are reading in a place with distractions or interruptions, you may not be able to understand what you're reading.
2. **Rephrase each paragraph in your own words -** You might need to approach complicated material sentence by sentence, expressing each in your own words.
3. **Read aloud sentences or sections that are particularly difficult -** Reading out loud sometimes makes complicated material easier to understand.
4. **Reread difficult or complicated sections -** At times, in fact, several readings are appropriate and necessary.
5. **Slow down your reading rate -** On occasion, simply reading more slowly and carefully will provide you with the needed boost in comprehension.
6. **Turn headings into questions -** Refer to these questions frequently and jot down or underline answers.
7. **Write a brief outline of major points -** This will help you see the overall organization and progression of ideas.
8. **Highlight key ideas -** After you've read a section, go back and think about and highlight what is important. Highlighting forces you to sort out what is important, and this sorting process builds comprehension and recall.
9. **Write notes in the margins -** Explain or rephrase difficult or complicated ideas or sections.
10. **Determine whether you lack background knowledge -** Comprehension is difficult, at times, and it is impossible, if you lack essential information that the writer assumes you have.

Suppose you are reading a section of a political science text in which the author describes implications of the balance of power in the Third World. If you do not understand the concept of balance of power, your comprehension will break down. When you lack background information, take immediate steps to correct the problem:

- Consult other sections of your text, using the glossary and index.
- Obtain more basic text that reviews fundamental principles and concepts.
- Consult reference materials.

Making Inferences and Drawing Conclusions

Read with purpose and meaning

Drawing conclusions refers to information that is implied or inferred. This means that the information is never clearly stated.

Writers often tell you more than they say directly. They give you hints or clues that help you "read between the lines." Using these clues to give you a deeper understanding of your reading is called ***inferring***. When you ***infer***, you go beyond the surface details to see other meanings that the details suggest or ***imply*** (not stated). When the meanings of words are not stated clearly in the context of the text, they may be ***implied*** - that is, suggested or hinted at. When meanings are implied, you may ***infer*** them.

Inference is just a big word that means a ***conclusion*** or ***judgement***. If you infer that something has happened, you do not see, hear, feel, smell, or taste the actual event. But from what you know, it makes sense to think that it has happened. You make inferences everyday. Most of the time you do so without thinking about it. Suppose you are sitting in your car stopped at a red signal light. You hear screeching tires, then a loud crash and breaking glass. You see nothing, but you ***infer*** that there has been a car accident. We all know the sounds of screeching tires and a crash. We know that these sounds almost always mean a car accident. But there could be some other reason, and therefore another explanation, for the sounds. Perhaps it was not an accident involving two moving vehicles. Maybe an angry driver rammed a parked car. Or maybe someone played the sound of a car crash from a recording. Making ***inferences*** means choosing the most likely explanation from the facts at hand.

There are several ways to help you draw conclusions from what an author may be implying. The following are descriptions of the various ways to aid you in reaching a conclusion.

General Sense

The meaning of a word may be implied by the general sense of its context, as the meaning of the word ***incarcerated*** is implied in the following sentence:

Murderers are usually incarcerated for longer periods of time than robbers.

You may infer the meaning of ***incarcerated*** by answering the question "What usually happens to those found guilty of murder or robbery?" Use the text box below to write down what you have inferred as the meaning of the word ***incarcerated***.

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If you answered that they are locked up in jail, prison, or a penitentiary, you correctly inferred the meaning of incarcerated.

Examples

When the meaning of the word is not implied by the general sense of its context, it may be implied by examples. For instance,

Those who enjoy belonging to clubs, going to parties, and inviting friends often to their homes for dinner are gregarious.

You may infer the meaning of ***gregarious*** by answering the question "What word or words describe people who belong to clubs, go to parties a lot, and often invite friends over to their homes for dinner?" Use the lines below to write down what you have inferred as the meaning of the word ***gregarious***.

If you wrote ***social*** or something like: "people who enjoy the company of others", you correctly inferred the meaning of ***gregarious***.

Antonyms and Contrasts

When the meaning of a word is not implied by the general sense of its context or by examples, it may be implied by an antonym or by a contrasting thought in a context. ***Antonyms*** are words that have opposite meanings, such as happy and sad. For instance, *Ben is fearless, but his brother is timorous.*

You may infer the meaning of ***timorous*** by answering the question "If Ben is fearless and Jim is very different from Ben with regard to fear, then what word describes Jim?" Write your answer on the following line.

If you wrote a word such as ***timid***, or ***afraid***, or ***fearful***, you inferred the meaning of ***timorous***.

A ***contrast*** in the following sentence implies the meaning of ***credence:***

Dad gave credence to my story, but Mom's reaction was one of total disbelief.

You may infer the meaning of ***credence*** by answering the question "If Mom's reaction was disbelief and Dad's reaction was very different from Mom's, what was Dad's reaction?" Write your answer on the following lines.

If you wrote that Dad believed the story, you correctly inferred the meaning of credence; it means "belief."

Be Careful of the Meaning You Infer!

When a sentence contains an unfamiliar word, it is sometimes possible to infer the general meaning of the sentence without inferring the exact meaning of the unknown word. For instance,

When we invite the Paulsons for dinner, they never invite us to their home for a meal; however, when we have the Browns to dinner, they always reciprocate.

In reading this sentence some students infer that the Browns are more desirable dinner guests than the Paulsons without inferring the exact meaning of ***reciprocate***. Other students conclude that the Browns differ from the Paulsons in that they do something in return when they are invited for dinner; these students conclude correctly that ***reciprocate*** means "to do something in return."

In drawing conclusions (making inferences), you are really getting at the ultimate meaning of things - what is important, why it is important, how one event influences another, how one happening leads to another. Simply getting the facts in reading is not enough - you must think about what those facts mean to you.

UNIDAD II (continuación)

Objetivo 2.2 Analizar el uso de traductores electrónicos como herramienta para la lectura y traducción de textos científicos.

Contenido

Traductores electrónicos: Definición, Tipos, Características, Ventajas y limitaciones

Previo a la clase

1. Investigar acerca de los diferentes tipos de traductores electrónicos, características y limitaciones.
2. Traer (en formato electrónico o impreso) un artículo científico de su interés.

En clase

1. Ejercitar el uso de traductores electrónicos en el laboratorio de computación. Quienes deseen traer sus equipos portátiles con conexión a la Internet pueden hacerlo para esta actividad

Luego de clase

Ejercicio formativo 3

Ejercitar el uso de las estrategias usadas y de traductores electrónicos en la lectura de textos en inglés para la elaboración de su proyecto de investigación. Traiga a clase impreso o a mano la redacción de dos antecedentes de investigación para su incorporación en el capítulo 2 de su proyecto. La revisión y evaluación formativa se hará en el aula.

Evaluación 3 (evaluación continua)

Se corregirá la incorporación de cinco antecedentes en el capítulo 2 del proyecto. Las instrucciones detalladas y fecha de entrega se darán en clase

Nota: Recuerde que se corregirá no sólo la traducción sino la correcta redacción del antecedente así como la organización de los mismos según los criterios enseñados en metodología.