

# Presenting Science in Publications:

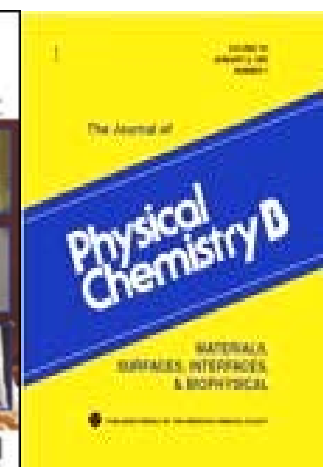
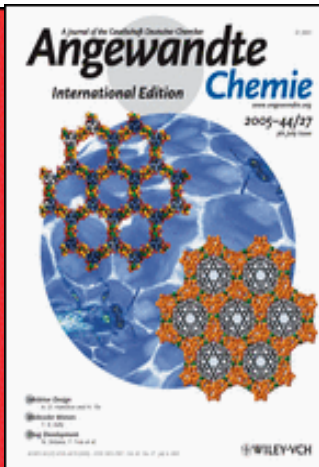
science writing, refereeing, ethics

**Hans Niemantsverdriet**

Editor Journal of Catalysis

Eindhoven University of Technology

Eindhoven, The Netherlands



# Why do Scientists Publish ?

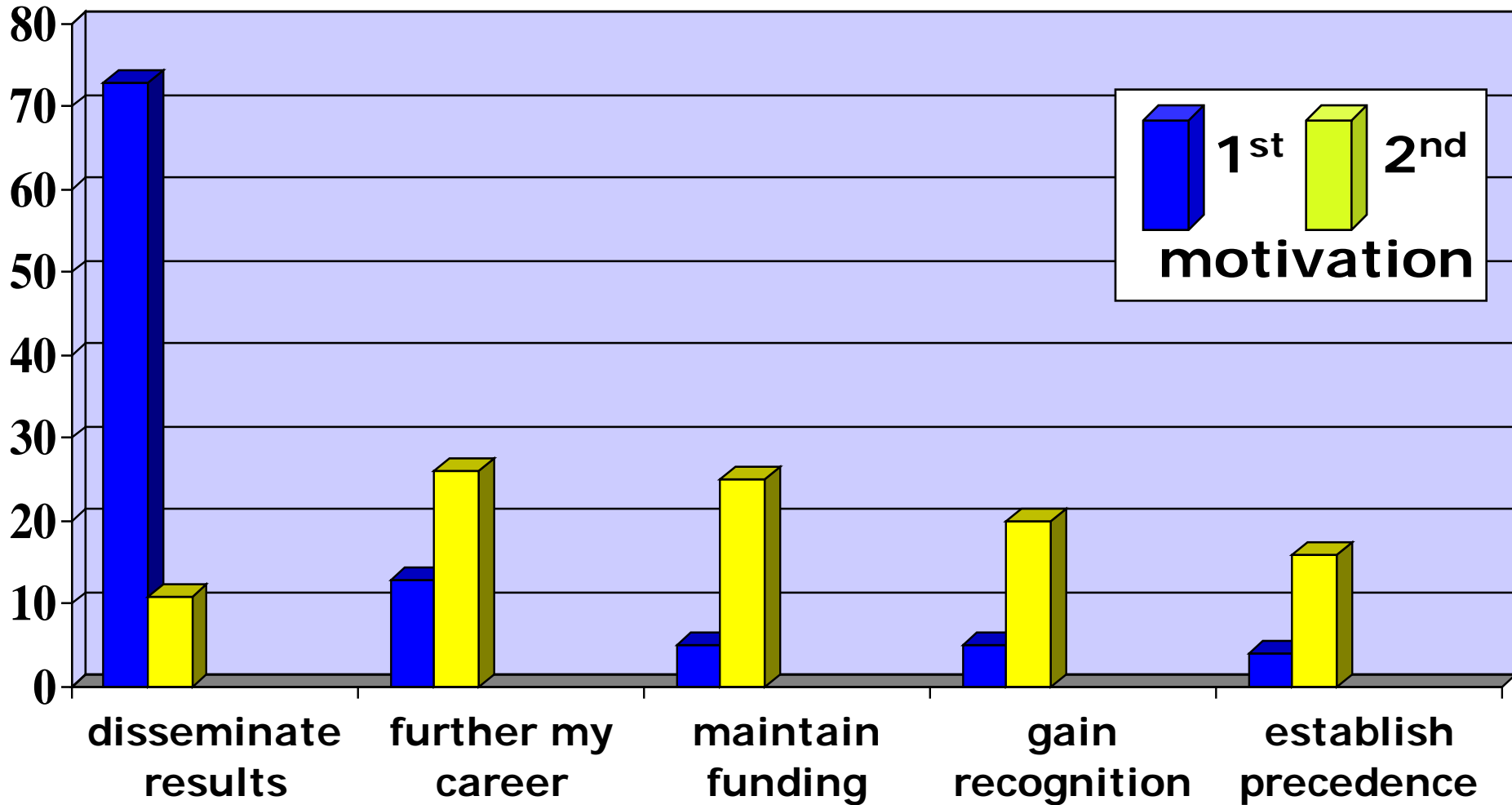
## Scientific reasons

- to present new results or methods
- to rationalize published results
- to summarize the state of a field

## Strategic reasons

- to maintain funding
- status (personal or institutional)
- to “claim” a subject
- to qualify for PhD defense, promotion,  
.....

# Why do scientists publish?



2005 Elsevier Study

# The Basic Questions

Answer the following questions before you decide to write:

- What do I have to say?
- Is it worth saying?
- What is the right format for my message?
- What is the audience for my message?
- What is the right journal for my message?

Richard Smith

in “How to write a paper” (George M. Hall, Ed.), BMJ Publishing, London, 1994

# Scientific writing:

**clarity**

**objectivity**

**accuracy**

**brevity**

# clarity

## Scientific writing:

clarity

objectivity

accuracy

brevity

- Ordinary, short, familiar, non-technical terms are better than long, grand, unfamiliar, technical and abstract vocabulary.
- Avoid complicated sentences

*English is a foreign language for many readers*

# objectivity

## Scientific writing:

clarity

objectivity

accuracy

brevity

- unbiased, unemotional, truthful
- give evidence to support your argument, while acknowledging any merit in other theories

*Separate results from interpretation*

# accuracy

## Scientific writing:

clarity

objectivity

accuracy

brevity

- facts need to be accurate and complete
- no vague, ambiguous, or misleading statements

*Carefully check all data and procedures you report*



# brevity

## Scientific writing:

clarity

objectivity

accuracy

brevity

- efficient word usage
- brief Introduction
- brief Discussion
- effective illustrations, tables

*picture ~ 250 printed words*

*effect >> 1000 words !!!!*

# Ethical Obligations of Authors

- present an accurate account and an objective discussion
- write concisely (journal space is precious)
- provide sufficient detail and references for repetition of research
- cite pertinent literature (avoid excessive self citation)
- identify hazards
- no fragmentation of research reports
- inform editor of related publications under consideration
- no duplication of previously published work (except letter, review)
- identify source of all information quoted (except common knowledge)
- criticism of other work is permitted, but not of persons
- coauthors share responsibility and accountability for contents

# Stages in Publishing a Paper

- 1 Before you write**
- 2 Writing the paper**
- 3 Editor, referees, revision, rejection**
- 4 Page proofs**
- 5 Promotion of your paper**

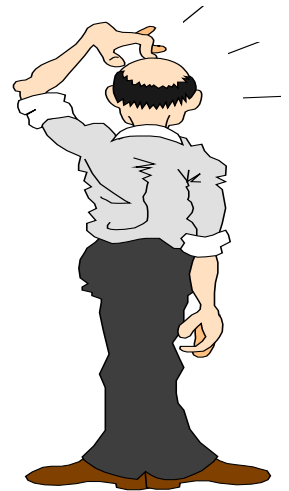
# Stage 1: Before You Write

- Try to write the main message in **one** sentence
- examine and select data, complete enough?
- review related literature, identify key papers
- determine who the (co)authors are
- select a journal
  - scope - audience
  - format (Instructions for Authors)

# Authorship: Who to Include ?

anyone who

- writes or revises part of the paper ?
- contributed substantially to the work ?
- can take responsibility for at least part of the paper ?
- can defend the entire paper ?
- is a good friend ?



# Authorship: Order of Names

- student, others (coach), supervisor  
or
- supervisor, others, student

my preference:

- **Main investigator, ... , most responsible author**

# Authorship: Order of Names

Journal of Catalysis 257 (2008) 81–86



Contents lists available at ScienceDirect

Journal of Catalysis

www.elsevier.com/locate/jcat



## The role of electron donors on lateral surfaces of $MgCl_2$ -supported Ziegler–Natta catalysts: Observation by AFM and SEM

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& advisor

Thesis  
supervisor

daily supervisor  
& project leader

ARTICLE INFO

ABSTRACT

### Article history:

Received 14 February 2008

Revised 11 April 2008

Accepted 11 April 2008

Available online 22 May 2008

### Keywords:

Model catalyst

Ziegler–Natta catalysis

An active model for a Ziegler–Natta propylene polymerization catalyst has been prepared by spin-coating of a  $MgCl_2$ /diether donor solution in ethanol on a flat silicon wafer, followed by crystal growth by Ostwald ripening to give well-defined  $MgCl_2$ -donor- $nEtOH$  crystallites. The growth of the crystallites on the flat wafer indicates the formation of only  $120^\circ$  edge angles in the presence of the diether donor, suggesting the preference for the formation of one particular crystallite face for the  $MgCl_2$ . In contrast, the presence of diisobutyl phthalate or ethyl benzoate leads to the formation of both  $120^\circ$  and  $90^\circ$  edge angles, indicating the formation of more than one face for the  $MgCl_2$ . Subsequent treatment with  $TiCl_4$  generates the catalyst and in propylene polymerization polymer forms on the lateral face of each

# Stage 1: 'Prewriting' stage

- write the main message in one sentence
- examine and select data, complete enough for publication?
- review related literature, identify key papers
- determine who the (co)authors are
- select a journal
  - scope - audience
  - format (Instructions for Authors)

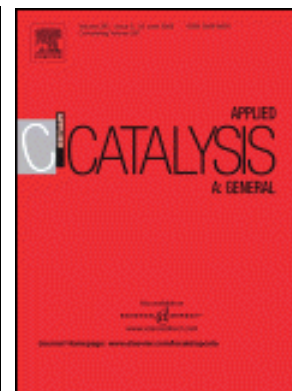


# Types of Publications

- Article, Full Paper
- Letter, Rapid or Priority Communication
- Note, Research Note, Shop Note, etc.
- Review
- Letter to the Editor
- Conference Proceedings  
*my advice: ignore! unless in regular journal*

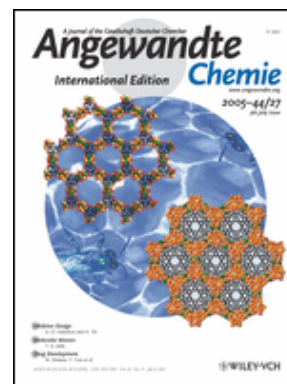
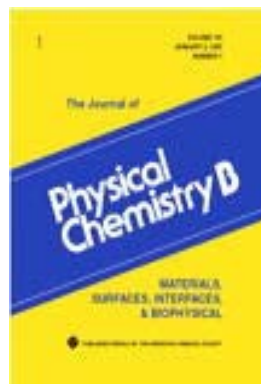
# Catalysis Journals

- Journal of Catalysis
- Catalysis Letters
- Applied Catalysis
- Catalysis Today
- Topics in Catalysis
- Journal of Molecular Catalysis
- Reaction Kinetics and Catalysis Letters
- Catalysis Reviews - Science and Engineering
- Catalysis Communications



# Catalysis in General Journals

- Journal of American Chemical Society
- Journal of Physical Chemistry
- Physical Chemistry - Chemical Physics (PCCP)
- Applied Surface Science
- Nature
- Science
- Angewandte Chemie



and many others

# Impact factor, Citation Half Life

## Impact factor 2007:

citations in 2007 to articles in 2005/2006  
divided by # of articles published in 2005/2006

*Typical range:*    *1-3 for topical journals*  
                          *4-8 for general journals*  
                          *~10 for reviews*  
                          *>20 Science, Nature*

## Citation half-life:

the number of years, going back from 2007,  
which account for 50% of the total citations  
received by the journal in 2007

*Typical range:*    *4-7 years*

# Impact factor, Citation Half Life, 2007

• J Catal	4.737	8.4	Elsevier
• Catal Lett	1.883	7.0	Kluwer
• Appl Catal A Gen	3.166	5.6	Elsevier
• Appl Catal B Env	4.651	4.9	Elsevier
• J Mol Catal A Chem	2.707	4.4	Elsevier
• J Mol Catal B	1.973	5.1	Elsevier
• Catal Today	2.764	6.3	Elsevier
• Topics in Catalysis	2.360	6.3	Kluwer
• Catal Comm	2.394	3.0	Elsevier
• Micro Meso Mater	2.207	4.7	Elsevier
• Angew Chemie	10.031	5.0	Wiley-VCH
• J Am Chem Soc	7.885	7.5	ACS
• J Phys Chem B	4.086	4.3	ACS
• Adv. Catal	7.667	>10	Elsevier
• Catal. Rev.	6.333	>10	Dekker

# Stage 2: Writing the Paper

<b>Basic Structure:</b>	<i>ideal length...</i> <i>(typed pages, doubly spaced)</i>
• Abstract	0.5 pages (doubly spaced)
• Introduction	1-2
• Experimental	2
• Results	6-8
• Discussion	4
• Conclusion	0.5
• References	1-2

# The Main Value of a Paper

## 1. Results!!

(including experimental section)

2. Interpretation ?

*Hence, separate results from interpretation*

# Use High-Quality Figures

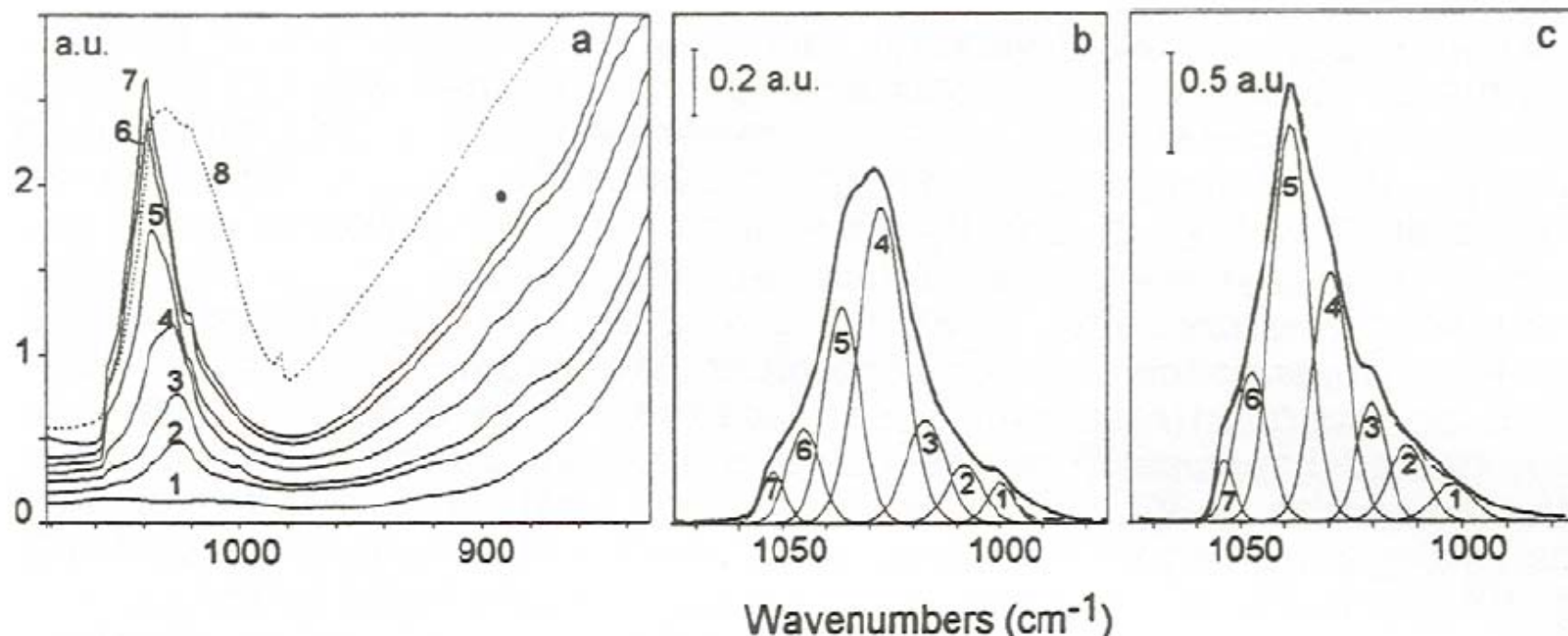


Figure 4. IR spectra of s.o. samples. Section a:  $\text{ZrO}_2$ , curve 1; ZV0.18(a)pH4, curve 2; ZV0.30(acac), curve 3; ZV0.58(a)pH4, curve 4; ZV0.83(a)pH4, curve 5; ZV1.05(i), curve 6; ZV1.21(a)pH4, curve 7; ZV4.65(a)pH4, curve 8. Section b: curve fitting of the band at 980-1070  $\text{cm}^{-1}$ ; 990-1000  $\text{cm}^{-1}$ , peak 1, 1007-1008  $\text{cm}^{-1}$ , peak 2, 1017-1020  $\text{cm}^{-1}$ , peak 3, 1025-1029  $\text{cm}^{-1}$ , peak 4, 1034-1038  $\text{cm}^{-1}$ , peak 5, 1042-1045  $\text{cm}^{-1}$ , peak 6 and 1050-1052  $\text{cm}^{-1}$ , peak 7. Sample s.o. ZV0.58(a)pH4. Section c: as in section b. Sample s.o. ZV1.21(a)pH4.

Will readers appreciate figures like these?



# Use High-Quality Figures

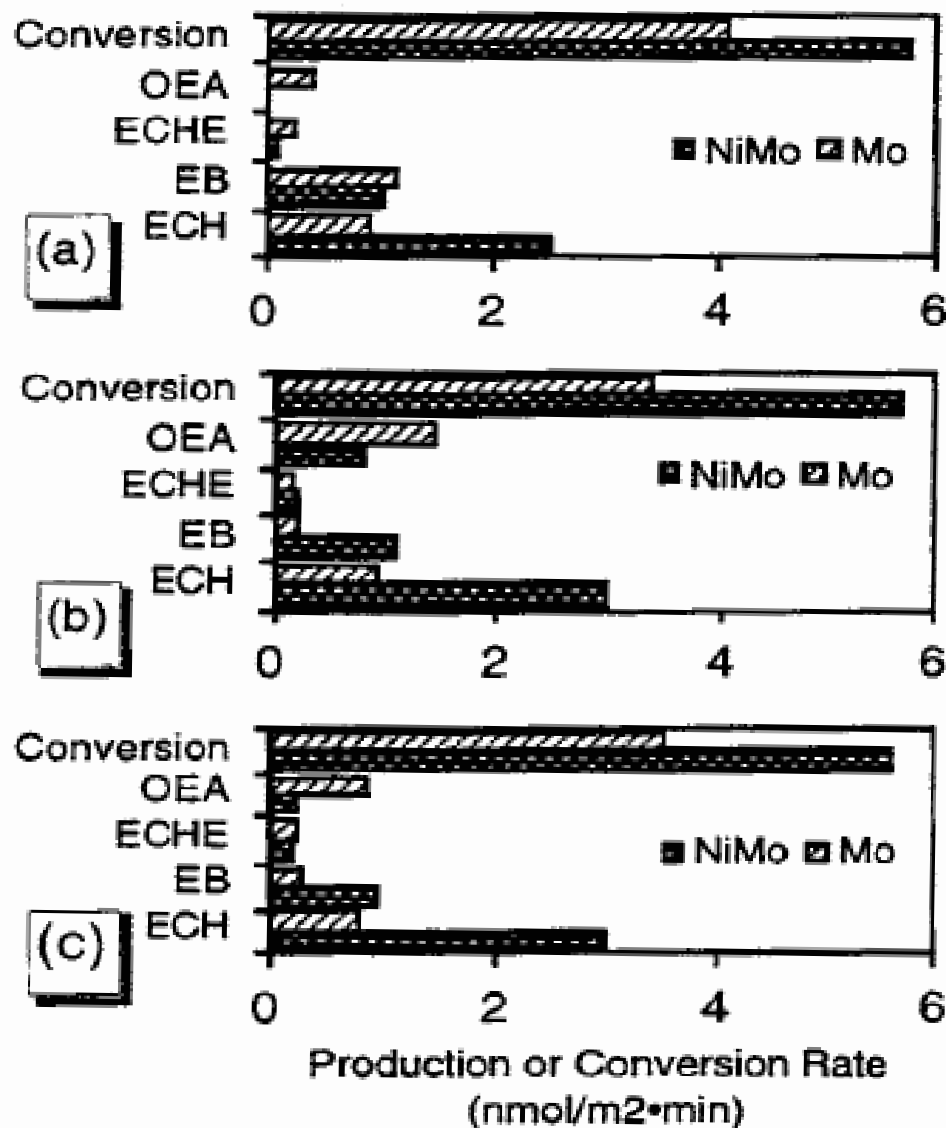


Figure 2. Comparison of conversion and production rates over Mo and Ni-Mo catalysts (T=320°C). (a) with no S-compounds (b) with H<sub>2</sub>S (c) with BT.

# Use High-Quality Figures

- Careful with graphics programs

*Excel, and Power Point produce poor figures*

- Meaningful labels on curves, not in legends
- Include 'as-measured' data (noise is ok!)
- Informative captions

# Stage 2: Writing the Paper

## Basic Structure:

- Abstract
- **Introduction**
- Experimental
- Results
- Discussion
- Conclusion
- References



# The Introduction

To write an effective introduction you must

- know your audience
- keep it short
- explain the reader what you have done
- explain why it's important
- convince them that you have done better than what has gone before
- try as hard as you can to hook them in the first line

Richard Smith

in "How to write a paper" (George M. Hall, Ed.), BMJ Publishing, London, 1994

# Stage 2: Writing the Paper

## Basic Structure:

- Abstract
- Introduction
- Experimental
- Results
- **Discussion**
- Conclusion
- References



# The Discussion

- keep it short!!!
- state the main results (justify shortcomings)
- note previously published findings, avoid long evaluations
- explain inconsistencies/differences,
- highlight new aspects
- discuss implications for practice, understanding, etc.
- outlook (need for further work, etc.)

A.A. Spence

in “How to write a paper” (George M. Hall, Ed.), BMJ Publishing, London, 1994

# Sections that usually get too little attention...

- Abstract *most read part of a paper*
- Key words *essential to find your paper*
- Figure captions *Figure + Caption tell a story  
no 'one-line captions' please*
- Title *main attention getter*
- References *not too many;  
avoid excessive self citation*

# The Title

**often long, complicated and ... boring**

**because**

- **scientists are terrified of journalism,  
anxious to avoid any hint of sensationalism**
- **scientists fear scientific imprecision**

**J.S. Lilleyman**

**in “How to write a paper” (George M. Hall, Ed.), BMJ Publishing, London, 1994**



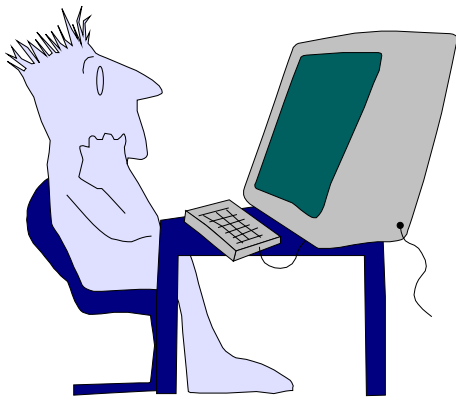
# Title

- **brief**
- **specific**
- **attractive**
- **contains signal words**

**What to do about**



**Writer's  
Block?**



# EXPERIENCE =

**USABILITY/ANALYTIC**

**+**

**DESIGN/CREATIVE**

## Left-Brain Functions

Analytic thought

Logic

Language

Science and  
math

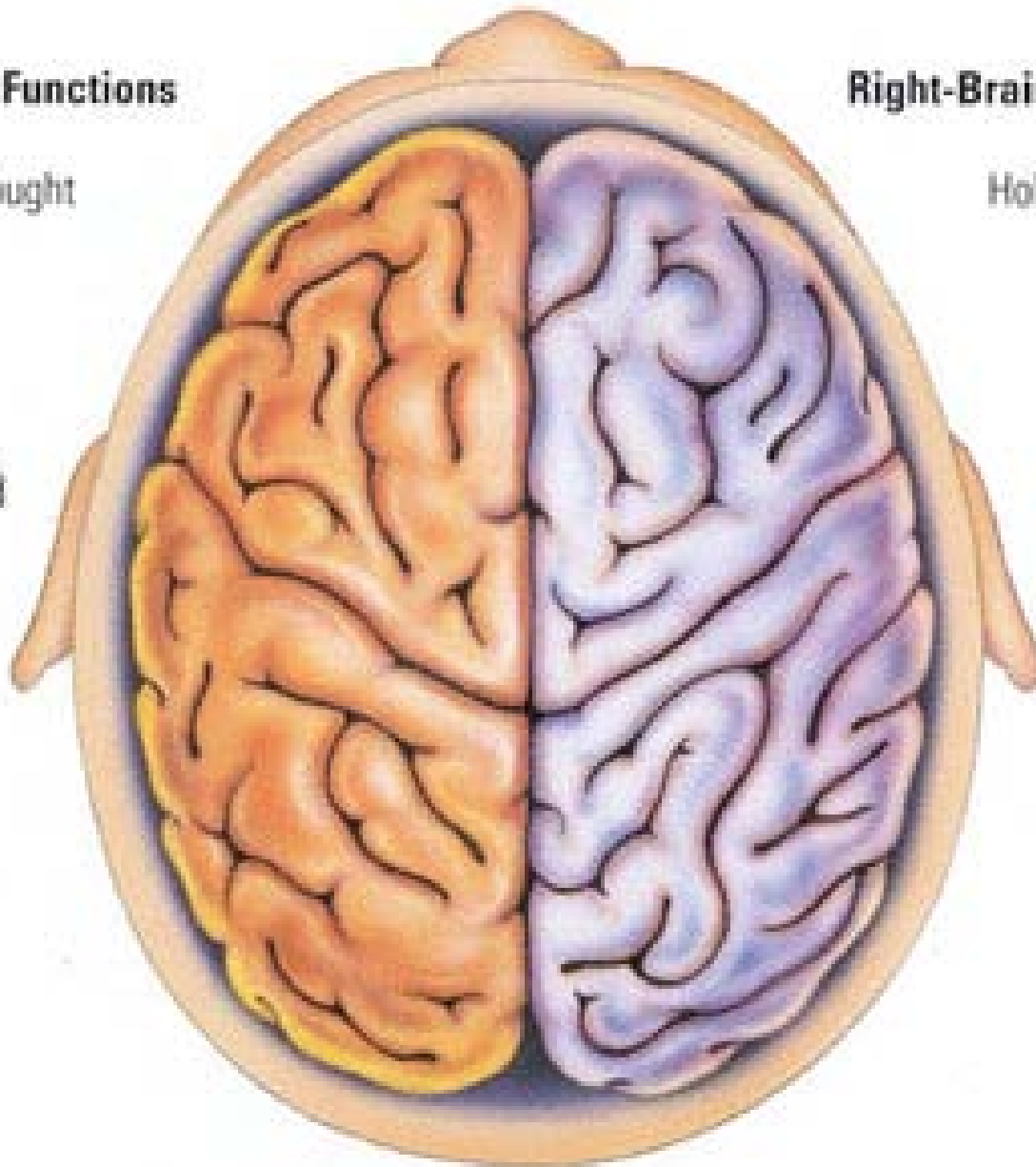
## Right-Brain Functions

Holistic thought

Intuition

Creativity

Art and  
music



# *The Golden Rule*

*Write First !!*

*- Then Get it Right*

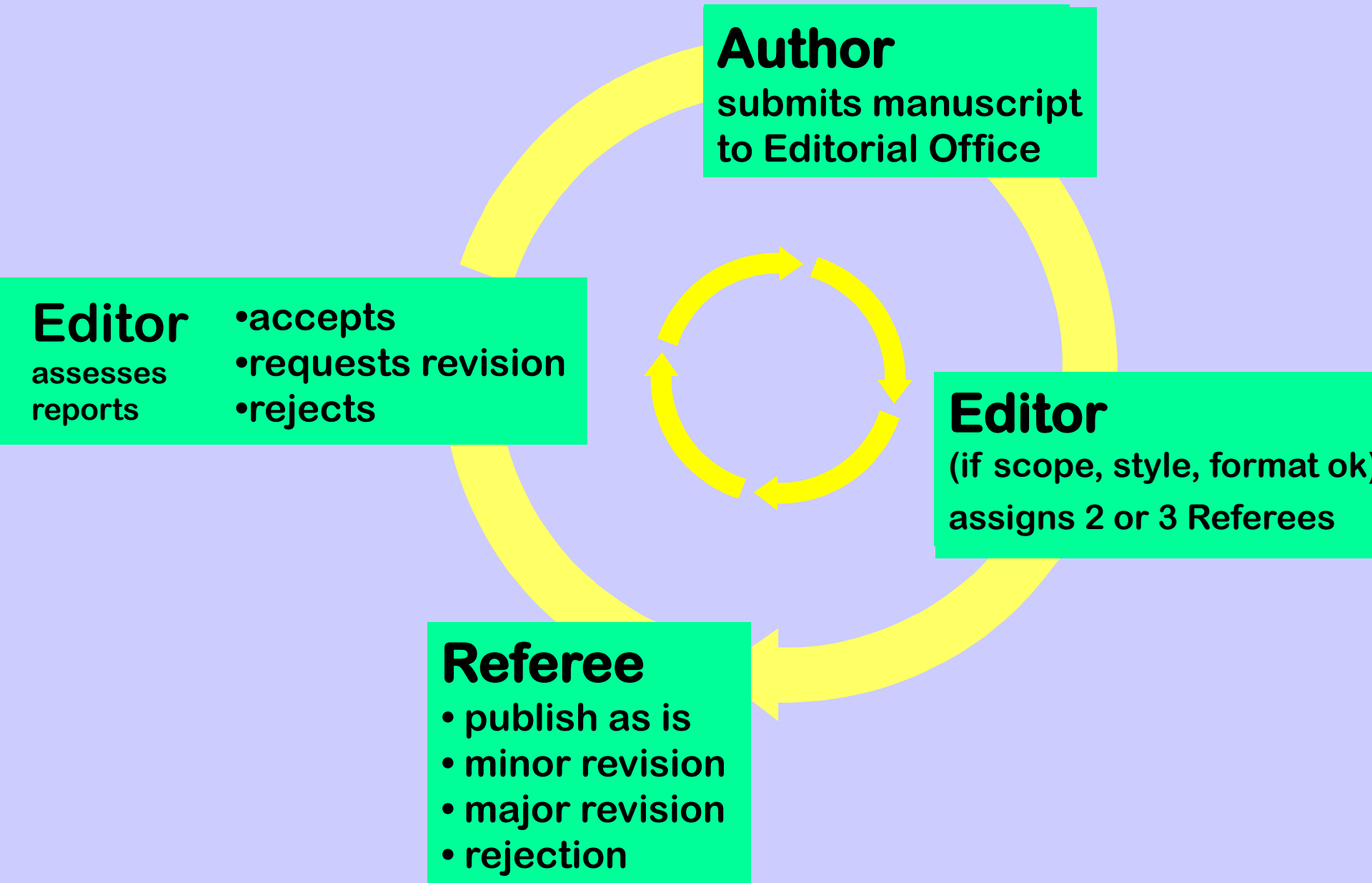


# write in a convenient order .....

*for example (but feel free to do it your way)*

- Experimental *brief but complete*
- Results *clear figures, tables, informative captions*
- Discussion *summarize key results, assess value, place in context, discuss significance*
- Conclusion *preferably a list*
- Introduction *key literature only; question; motivation*
- References *not too many, avoid excessive self citation*
- Title *specific, challenging*
- Abstract *what, why, how, and significance*

# Stage 3: Editors & Referees



# Ethics “headline” statement in EES

- **...noting the paper should:**
  - be the authors' own original work, not previously published elsewhere
  - reflect the authors' own research and analysis-- in a truthful and complete manner
  - properly credit the meaningful contributions of co-authors and co-researchers
  - not be submitted to more than one journal for consideration, and
  - be appropriately placed in the context of prior and existing research.

# Ethics statement (2) “the big issues”

- **Originality and Plagiarism**

- Papers should be “entirely original works”
- Plagiarism takes many forms, from ‘passing off’ another’s paper as the author’s own paper, to copying or paraphrasing substantial parts of another’s paper (without attribution), to claiming results from research conducted by others

- **Multiple, Redundant or Concurrent Publication**

- Manuscripts should not be published that describe essentially the same research in more than one journal or primary publication
- In general, an author should not submit for consideration in another journal a previously published paper.

- **Authorship of the Paper**

- Authorship = “those who have made a significant contribution to the conception, design, execution, or interpretation of the reported study”
- All those who have made significant contributions should be listed as co-authors
- Others who have participated in certain substantive aspects of the research project, they should be acknowledged or listed as contributors

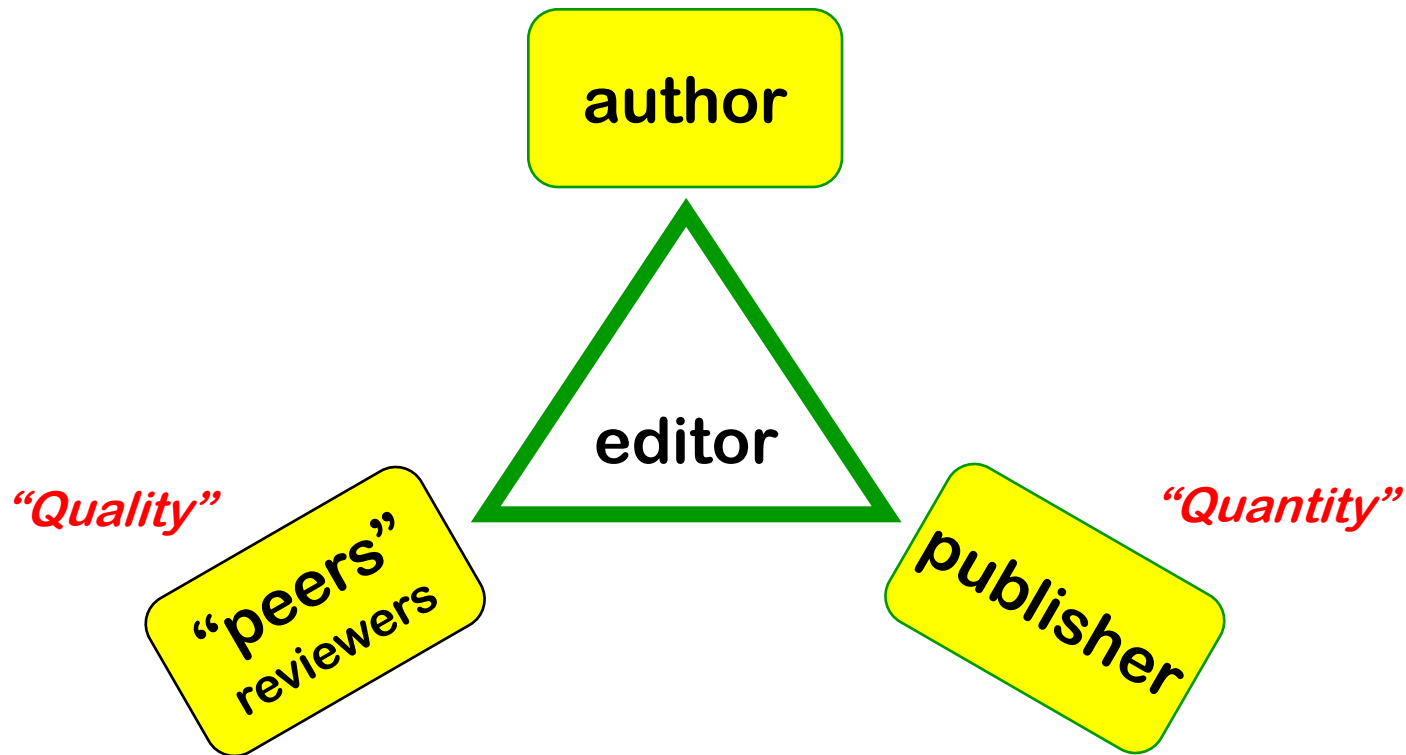


# Authors: Read Instructions!!!

In particular:

- **submission (almost always on line)**
  - WORD? PDF? Figures separate or included?
- **double spacing, etc.**
- **reference style**
  - A.B. Author and S.U. Pervisor, J. Catal. 25 (1999) 1120
  - Author, A.B., Pervisor, S.U., 1999, J.Catal. 25(3), 1120-1127
- **covering letter (*suggest referees?*)**

# Editor: Intermediate



## *Editor (e.g. Journal of Catalysis)*

- *assesses the quality (incl. novelty) of a manuscript*
- *rejects poor or deficient manuscripts (40-50%)*
- *invites reviewers to assess the manuscripts*
- *assists authors to improve their manuscript*

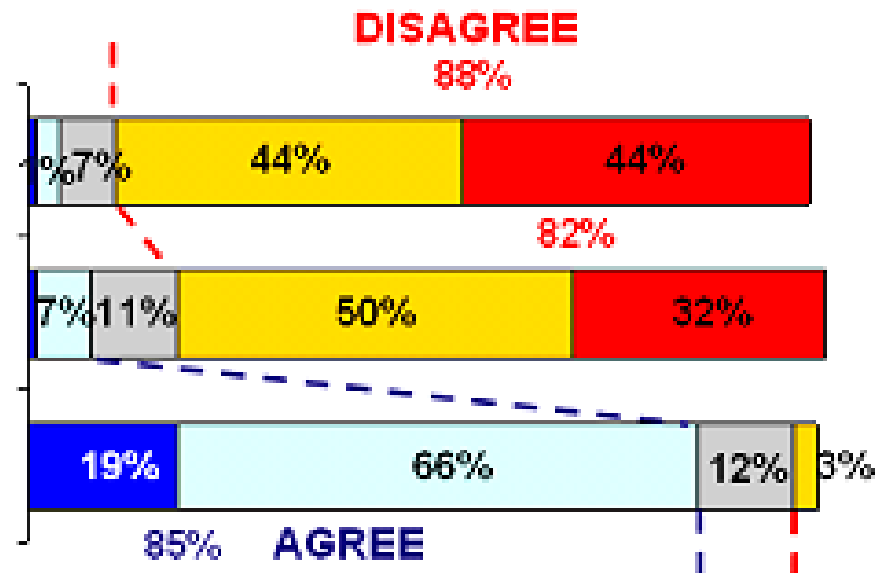
# Peer review is important and is supported

- **Universal agreement that refereed journals are required**
  - 88% disagree that readers do not need refereed journals
- **Majority believe that peer review improves an article**
  - 82% disagree that peer review does *NOT* improve an article's quality.
    - Engineering and Materials Sciences more sceptical
- **Committed to peer review**
  - 85% are willing to review a reasonable number of their peer's research (ranging from anything between 2 and 30 papers a year)
  - Heads of Dept highest 87% but drops to 80% for post-graduates

Readers do NOT really need refereed journals

Peer review does NOT improve the quality of an article

I am willing to review a reasonable number of my peer's research papers



# Referee: Enemy or Friend?

*Normally a helpful friend,  
but...*

# Ethical Obligations of Reviewers

- every scientist has an obligation to do a fair share of reviewing
- should refuse manuscripts outside his/her area of expertise
- should judge objectively, respect intellectual independence
- sensitive to conflicts of interest (e.g. his own future publications)
- refuse to review work of (co)authors that are too close
- treat manuscripts as confidential
- explain judgments, supported by references; no unsupported assertions
- should be alert to correct and complete citation of relevant work
- should act promptly, i.e. within 2-3 weeks
- should not use or disclose unpublished information without consent

# Editor's Decision

- ***acceptance***

*(direct acceptance is rare)*

- ***revision, minor or major***

*(normal)*

- ***rejection***

*(30 – 50%)*

***Authors have the right of rebuttal !!!!!***

# Author:

- *consider all comments carefully*
- *revise paper where appropriate*
- *write reply to the referee reports*
- *indicate actions taken*
- *submit revised paper asap*

*(i.e. within 2-3 weeks)*

# Stage 5: Promoting your paper

*Average number of citations:*

*1 per paper per year!*

- send preprints & reprints to people who should know your work
- give presentations
- put abstract and best figure(s) on web page
- .....



# References

- **How to write a paper, (George M. Hall, Ed.), BMJ Publishing Group, London, 1994**
- **Scientific Papers and Presentations, M. Davis, Academic Press, San Diego, 1997.**
- **The ACS Style Guide, A Manual for Authors and Editors (J.S. Dodd, Ed.), ACS, Washington, 1997**
- **The Elements of Style, W. Strunk and E.B. White, Macmillan Publishing, New York, 1979.**