

# Scientific & Critical Writing

## Population & Health Science

Stephen Griffin

[s.m.griffin@bham.ac.uk](mailto:s.m.griffin@bham.ac.uk)



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# Successful scientific writing should be:

- Clear
- Concise
- Precise



# Clarity

- Clarity should take precedence over flowery language.
- Although your writing should be interesting and engaging, your reader does not want to work overly hard to understand your arguments.
- Think about how to convey complex ideas clearly and accessibly.



# Examples of factors that make writing less clear

## Unclear subject in a sentence, or use of vague pronouns

*Of those surveyed, a small number asked for training to be conducted in a laboratory setting, while a large number expressed a preference for traditional training activities. These are clearly ill suited to integrated, work-based learning.*



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What?



# Examples of factors that make writing less clear

- **Assuming the reader will know what you mean**

*The difference between implicit stereotyping and implicit prejudices (or evaluations) is that stereotyping focuses on the cognitive representations of culturally held beliefs about outgroup members while prejudices are about the negative affective responses.*



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## Assuming the reader will know what you mean

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Meaning?

Such as?



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Such as?



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## Convolutd sentence structures

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*One of the most widely appreciated applications of physics research since their discovery in 1895 by Rotege is that of X-rays to medical imaging.*

This clause interrupts the flow of the sentence, and confuses matters because the thing to which “their” refers actually comes after “their,” and is ambiguous.



# Examples of factors that make writing less clear

## Too many ideas or clauses within one sentence

*Nanophysics research is primarily concerned with the manipulation of matter on the molecular and atomic level, incorporating the fabrication, modification and characterisation of systems on the length scale of the nanometre, which is  $10^{-9}\text{m}$ , with the consensus among the field being that the characteristic length scale of nanoscience extends from  $1\text{nm}$  to  $100\text{nm}$ .*



# Clarity

## Activity 1

Compare the two extracts from an essay. Both are conveying similar ideas, but which does so with greater clarity?

How has the writer achieved this clarity?

You should consider:

- Vocabulary choices
- Sentence structures
- Use of punctuation
- Sequencing of ideas and links between sentences



# Clarity

## Activity 1

The process of Hormone Replacement Therapy (HRT) contains oestrogen so that it can treat this imbalance in hormones, and is also combined with progestogen for endometrial protection for women who still have their uterus (2, 5), and has been promoted for not only the relief of menopausal symptoms, but also the reduction in the risk of suffering from osteoporosis, the reduction of becoming a sufferer of cardiovascular disease and also for improvement in the general quality of the life for those who partake in the treatment. (2, 5-7). Nearly 70% of women will cease HRT within nine months of starting, despite most guidelines recommending its use for four to five years (8, 9), and approximately 10% of 45-55 year old women in the UK currently use the treatment. This is thought to be attributed to treatment being ineffective, unacceptable treatment side effects (particularly the re-emergence of monthly bleeds due to progestogen effects) or simply patients feeling better. Furthermore, symptom recurrence rates for them may be as high as 50% (2).



# Concision

- Conveying in depth concepts in a few carefully chosen words.
- Identify and cut 'idle' words.
- Words should not be cut at the expense of clarity.
- Edit work in order to find the most succinct way of expressing your content.



# Concision

Consider how the wordy phrases or sentences below could be made more concise.

Remember: a key part of the editing process is removing idle words.

- exactly identical
- at the present time
- of paramount importance
- brown in colour
- provide an indication of
- did a study of



# Editing Techniques: a few to try

Once you have written your paper, put it away for a few days before rereading.

Print your work in a different font. Enlarge the text for the editing process. Making your work look alien is good for objectivity.

Paste individual paragraphs into separate docs and insert line breaks. This helps identify lengthy sentences, repetition and errors in sequencing & logic.

Read your work out loud (and record it).



# Precision

- Choose your words carefully.
- Avoid vague or ambiguous vocabulary.
- Quantify things, be concrete & give examples.



# Precision

## Activity 2

Read the three phrases below. In what ways could they be considered ambiguous or imprecise in the context of a scientific paper? How could the choice of vocabulary be amended?

1. The findings are significant.
2. A large increase was seen.
3. Males performed better in condition A.



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Ambiguous language – has a mathematical meaning as well as meaning important.



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Why not use a figure here? It is more precise.



# Precision

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1. The findings are significant.
2. A large increase was seen
3. Males performed better in condition A.

Compared to females?  
Compared to condition B?



# Other considerations

- Consistency
- Objectivity
- Logic
- References and paraphrasing
- Use of the third person
- Presentation



# Critical writing - introduction

- Critical writing
- Descriptive writing



# Descriptive & critical writing

## Activity 3

Read through and compare the two paragraphs.

How can you tell which one of these is critical writing and which one is descriptive writing?

Use the table provided to make a few notes about the differences you see.



# Characteristics of descriptive & critical writing

## What is descriptive writing?

“The most characteristic features of descriptive writing are that it will describe something, but will not go beyond an account of what appears to be there.”

(University of Leicester. Learning Development 2013)



# Characteristics of descriptive & critical writing

## What is descriptive writing?

- factual; the facts about a particular issue
- setting out the background
- details of an organisation
- an account of how research was undertaken
- a summary of a sequence of events
- reports of something that happened



# Characteristics of descriptive & critical writing

## What is critical writing?

“Critical writing is an engagement with ideas, an involvement in academic debate. It requires “a refusal to accept the conclusions of other writers without evaluating the arguments and evidence they provide.”

(University of Leicester. Learning Development 2013)



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# Characteristics of descriptive & critical writing

## What is critical writing?

- more than just description or factual information – challenging, questioning, and forming arguments
- engaging with evidence and analysing the arguments of other academics
- open minded and objective enquiry
- presenting reasons to dispute or support a particular finding/line of argument
- providing an alternative approach to a theory or point of view
- recognising the limitations of evidence - either your evidence or the evidence provided by others
- ability to think around a problem
- application of humility and caution when challenging established positions; critical writing might use such phrases as “It could be argued that . . .”; “An alternative viewpoint might suggest that...”



# When should we use descriptive & critical writing?



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# When should we use descriptive & critical writing?

When do you use these different kinds of writing?	
Descriptive writing – when you need to	Critical writing – when you need to:
Introduce	Organise and evaluate evidence
Describe e.g. describe resources	Make comparisons between materials
Describe how an experiment was carried out	Identify why something did not work
List the details	Apply your own judgements
Sketch out areas of knowledge	Make links between areas of knowledge
Quote from writers in the field	Weigh up alternatives
Provide information or data	Draw conclusions
Summarise	Evaluate/argue



# Models for writing critically

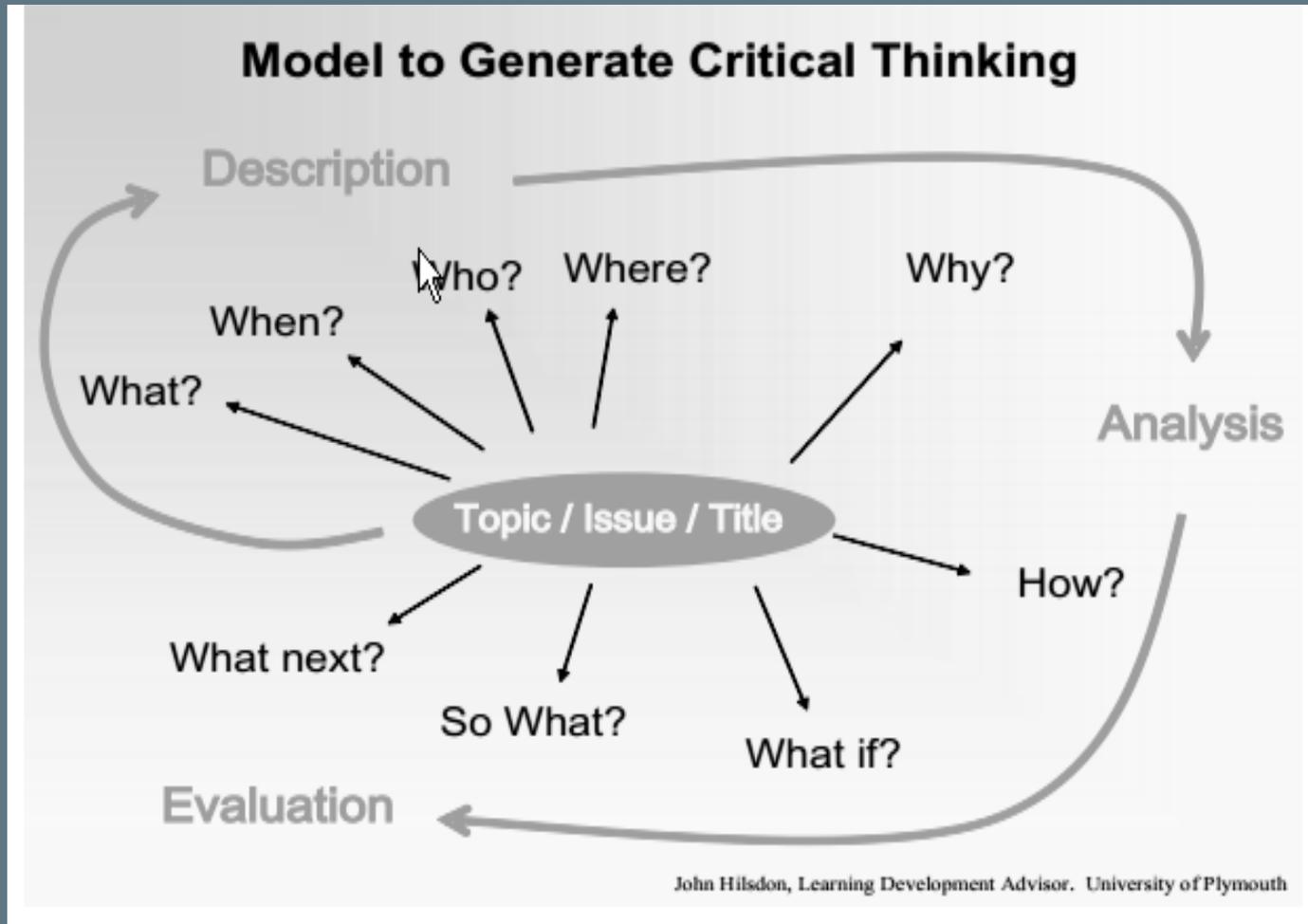
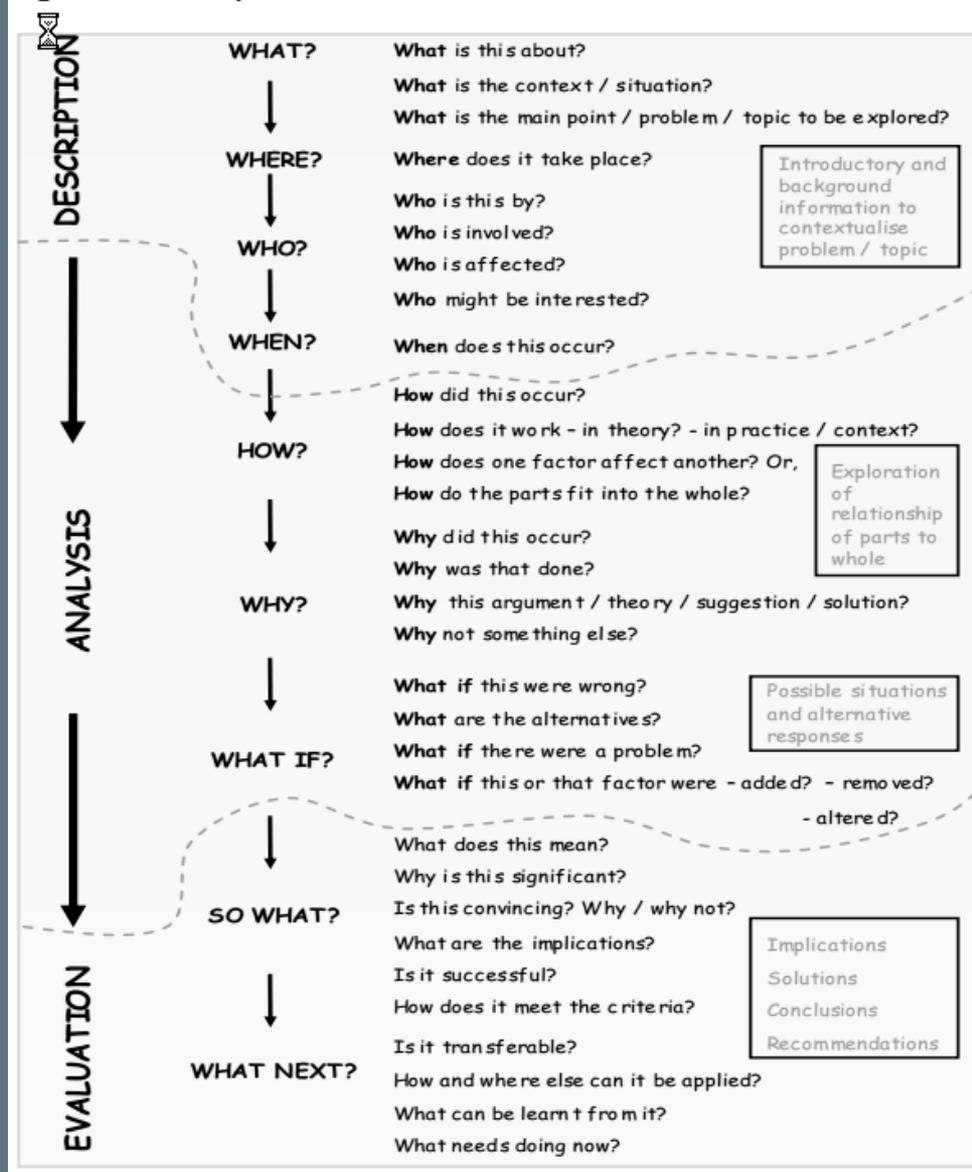


Figure 2. Critical questions – a linear model



# Evaluating your own work to check for critical writing

## My critical thinking and writing support for my essays

Question to myself	Comment or action required
What am I trying to write in this essay?	
How current is my material?	
Who are the main authors who seem important in this area and have I read them?	
Have I made a series of convincing arguments?	
What are my key points?	
How have I provided clear links between each step of my arguments?	
Have I tried to look at the problem from more than one perspective?	
Who would agree with my conclusions? Do I convince myself?	

**U** Please Note, This material is adapted from Cottrell, Stella (2011). Critical Thinking Skills, 2<sup>nd</sup> ed. Palgrave Macmillan, p159. It's just an example – make up your own list of questions.



# Further study

## ASC Critical Thinking workshops

- Argumentation
- Credibility of source material
- Reasoning & fallacies



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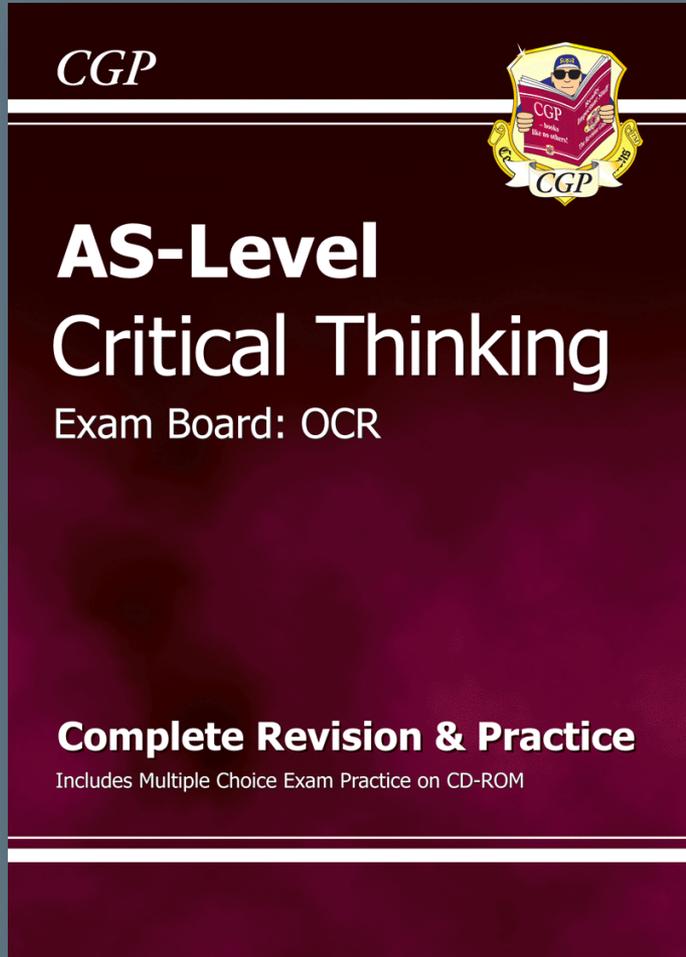


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# Recommended resources

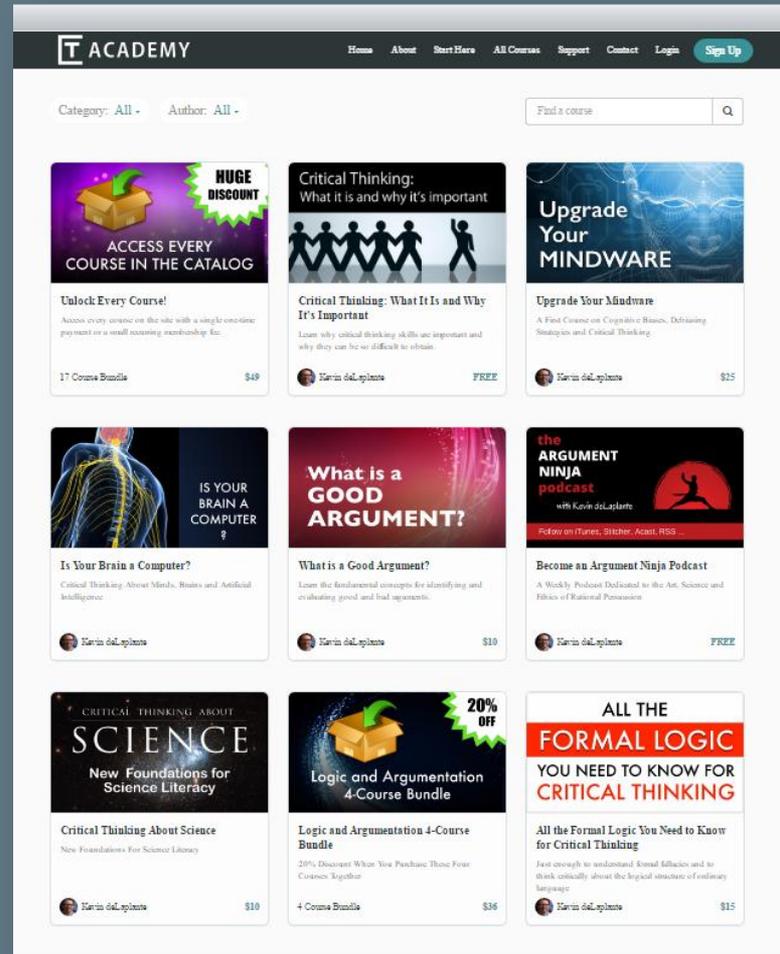


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