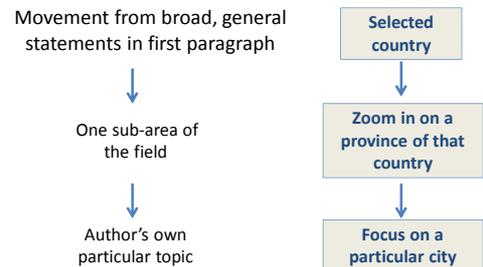


## Writing Scientific Research Articles

Using suggested material and methods from Cargill & O'Connor (2009)

Slides put together by Vanessa van Der Haam, Centre for Teaching & Learning, Albany

### General pattern of Stage 1 of Introduction



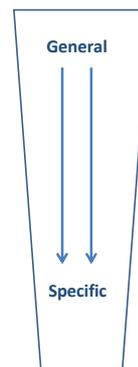
### Task: Country to city in Stage 1

- Look at the Introduction of your selected PEA. What is the country? The province? The city?
- What tense is used?
- How is the literature cited?

*Britton-Simmons & Abbott (2008)*

What is the country?	Biological invasions
The province?	Factors controlling the invasion process
The city?	The interaction of the factors and processes

### Five stages of an introduction



1. Context for the problem to be investigated and claim to centrality or importance.
2. More specific statements about the aspects of the problem already studied by other researchers,
3. Statements that indicate the need for more investigation.
4. Purpose/objectives of the writer's study or outlining its main activity or findings.
5. Optional statement(s) that give a positive value or justification for carrying out the study.

Task 1-Read the introduction to the BS paper and identify the stages

### Highlighting gaps

- X remains a major challenge
- X has rarely been manipulated experimentally
- The interaction of X with Y is not well understood
- It is presently unclear how ....
- Moreover, most of what we know about X comes from Y
- The mechanisms involved in X have been investigated at the Y level

### Purpose/objectives

- In this study we used X to better understand the effects of Y
- In an A experiment we manipulated both B and C to examine how these factors independently and interactively influence D
- We supplement the experimental results with a F model which we use to examine how G influences H in the long term
- Although a successful invasion requires both establishment and spread of the invader most studies have looked at just one of these processes (...). We take an integrative approach by employing both short and long term ...allowing us to examine the effects of B and C on the entire invasion process

### Strategic language re-use: Gathering sentence templates

You can expand your repertoire of sentence structures by removing the content (most often the noun phrases, indicated by the NP in the example below) from sentences that appeal to you and re-use the shell (or sentence template) in your own content.

#### Example:

Russell and Fillery (1996), using a stem-feeding technique, have shown that *in situ* <sup>15</sup>N-labelling of lupin plants growing in soil cores enabled total below-ground N to be estimated under relatively undisturbed conditions, but they indicated that the technique was not adaptable to all plants, particularly pasture species.

[Authors], using [NP1], have shown that [NP2] enabled [NP3] to be estimated under [adjective] conditions but they indicated that the technique was not adaptable to all [NP4], particularly [NP5].

*You can adapt the sentence template for use in an appropriate context*

Another example: From a **purpose statement** form an article by Lee et al. (2000) entitled "Water use patterns and agronomic performance for some cropping systems with and without fallow crops in a semi-arid environment of northwest China".

As part of a long-term research effort aimed at establishing a sustainable farming system in the semi-arid and sub-humid regions of northwest China, this paper presents a detailed study on the water use patterns and agronomic performance for some cropping systems with and without fallow crops in a semi-arid environment. The objectives of this study were to: (1) determine the grain and aboveground biomass production and water-use efficiency of individual crops grown in the rotation, (2) analyse the seasonal and inter-annual patterns of soil water storage and utilization as well as water stress for the four major rotation crops of winter wheat, corn, potato and millet; (3) determine the grain and above-ground biomass production and water use efficiency for different rotation systems and evaluate the capacities of the rotation systems with and without fallow crops to utilise soil water storage in conjunction with seasonal precipitations; (4) establish whether the introduction of fallow wheat crops into the wheat monoculture significantly influences the quantity of water stored in the soil that will be used by the subsequent wheat crop; and (5) discuss the characteristics of soil conservation for different rotation systems.

If we cross out all the noun phrases (specific content chunks) that relate specifically to this study, we have a series of frameworks for sentences or sentence templates that can be adapted for a purpose statement in a suitable context

~~As part of a long-term research effort aimed at establishing a sustainable farming system in the semi-arid and sub-humid regions of northwest China, this paper presents a detailed study on the water use patterns and agronomic performance for some cropping systems with and without fallow crops in a semi-arid environment. The objectives of this study were to: (1) determine the grain and aboveground biomass production and water use efficiency of individual crops grown in the rotation, (2) analyse the seasonal and inter-annual patterns of soil water storage and utilization as well as water stress for the four major rotation crops of winter wheat, corn, potato and millet; (3) determine the grain and above-ground biomass production and water use efficiency for different rotation systems and evaluate the capacities of the rotation systems with and without fallow crops to utilise soil water storage in conjunction with seasonal precipitations; (4) establish whether the introduction of fallow wheat crops into the wheat monoculture significantly influences the quantity of water stored in the soil that will be used by the subsequent wheat crop; and (5) discuss the characteristics of soil conservation for different rotation systems.~~

With all the noun phrases (specific content chunks) that relate just to this particular study crossed out, we have a series of frameworks for sentences or sentence templates that can be adapted for a purpose statement in a suitable context :

As part of a long-term research effort aimed at [NP1], this paper presents a detailed study on [NP2]. The objectives of this study were to: (1) determine [NP3]; (2) analyse [NP4]; (3) determine [NP5] and evaluate [NP6]; (4) establish whether [NP7] significantly influences [NP8]; and (5) discuss [NP9].

- Obviously you would only use this template if it enabled you to express the meanings you were trying to make and you would adapt it for use in your context
- Also see Manchester University's academic phrasebank

## Country to city in Stage 1

### Linking sentences

- Old information to new information
- Some astonishing questions about the nature of the universe have been raised by scientists studying black holes in space.
- The collapse of a dead star into a point perhaps no larger than a marble creates a black hole.
- A black hole is created by the collapse of a dead star into a point perhaps no larger than a marble
- So much matter compressed into so little volume changes the fabric of space around it ...(Williams, 2003)

Legumes form symbiotic associations with N<sub>2</sub>-fixing soil-borne bacteria of the *Rhizobium* family. The symbiosis begins when compatible bacteria invade legume root hairs, signalling the division of inner cortical root cells and the formation of a nodule. Invading bacteria migrate to the developing nodule by way of an 'infection thread', comprised of an invaginated cell wall. In the inner cortex, bacteria are released into the cell cytosol, enveloped in a modified plasma membrane (the peribacteroid membrane (PBM), to form an organelle-like structure called the symbiosome, which consists of bacteroid, PBM and the intervening peribacteroid space (PBS; Whitehead and Day, 1997). The bacteria, subsequently, differentiate into the N<sub>2</sub>-fixing bacteroid form. The symbiosis allows the access of legumes to atmospheric N<sub>2</sub>, which is reduced to NH<sub>4</sub><sup>+</sup> by the bacteroid enzyme nitrogenase. In exchange for reduced N, the plant provides carbon to the nodules to support bacterial respiration, a low -oxygen environment in the nodule suitable for bacteroid nitrogenase activity, and all the essential nutritional elements necessary for bacteroid activity. Consequently, nutrient transport across the PBM is an important control mechanism in the promotion and regulation of the symbiosis.

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## Using citation to develop your own argument

Different citation methods used:

1. Information prominent citation – focus of attention is only on the information being presented
2. Author prominent citation – the name of the author of the information is given prominence in the sentence
3. Weak author prominent citation – the ideas of the author(s) are given prominence, but author names do not appear in the main part of the sentence

*The different methods contribute to the way in which the writer's argument is developed*

Task What is used in the introduction to the article?

## Using citation to develop your own argument

### 1. Information prominent citation

*Topic sentence*

Shrinking markets are also evident in other areas. The wool industry is experiencing difficulties related to falling demand worldwide since the development of high-quality synthetic fibres (Smith, 2000)

*This is the default method in many areas of science and you'll notice that the Introductions of the two PEA use only this method.*

## Using citation to develop your own argument

**2. Author prominent citation style 1** *Gives more option to show you (the writer) agree with Smith here*  
 Shrinking markets are also evident in other areas. **As Smith (2000) pointed out**, the wool industry is experiencing difficulties related to falling demand worldwide since the development of high-quality synthetic fibres.

**or Author prominent citation style 2**

Shrinking markets are also evident in other areas. **As Smith (2000) argued** that the wool industry was experiencing difficulties related to falling demand worldwide since the development of high-quality synthetic fibres. **However, Jones et al. (2004) found** that industry difficulties were more related to quality of supply than to demand issues. **It is clear that considerable disagreement exists about the underlying sources of these problems.**

### 3. Weak author prominent citation style

**Several authors have reported that** the wool industry is experiencing difficulties related to falling demand since the development of high-quality synthetic fibres (Nguyen, 2005; Smith, 2000; Wilson, 2003). **For example, Smith (2000) highlighted...**

*Writers choose their citation method to fit with the way their paragraph is advancing their argument*

From Introduction to McNeill et al. (2003)

Introduction text	Citation method
Foliar feeding does not disturb the system and has the additional advantage that shoots tolerate higher concentrations of N than roots (Wittwer et al. 1963). Spray application of <sup>15</sup> N-labelled urea has been successfully used to label legumes <i>in situ</i> under field conditions (Zebarth et al. 1991) <b>but runoff of <sup>15</sup>N-labelled solutions from foliage to the soil will complicate interpretation of root-soil dynamics.</b> Russell and Fillery (1996), using a stem-feeding technique, have shown that <i>in situ</i> <sup>15</sup> N-labelling of lupin plants growing in soil cores enabled total below-ground N to be estimated under relatively undisturbed conditions, but they indicated that the technique was not adaptable to all plants, particularly pasture species. Feeding of individual leaves with a solution containing <sup>15</sup> N is a technique that has been widely used for physiological studies in wheat (Palta et al. 1991) and legumes (Oghoghorie and Pate 1972; Pate 1973). <b>The potential of the technique for investigating soil-plant N dynamics was noted as long as 10 years ago by Ledgard et al. (1985) following the use of <sup>15</sup>N leaf-feeding in a study of N transfer from legume to associated grass.</b>	Information prominent Information prominent <u>Author's evaluation statement</u> Author prominent Information prominent <u>Author prominent but using the passive so that the link (technique) can come first in the sentence as old information</u>

## The Discussion

1. Check if it is separate from results and if there is a conclusion
2. Check the use of subheadings
3. As you redraft the discussion check the title still fits
4. Make sure that it fits clearly with the introduction, particularly the 'country' you began at, the gap and your purpose
5. Look out for unnecessary repetition with the introduction

## What's in the discussion?

- Reference to the main purpose
- A restatement of the most important findings, in order of significance and
- Explanation for findings-ref to literature
- Implications (in broader context)
- Recommendations (future research/applications)
  - Whether they support the hypothesis
  - Whether they agree with the findings of other researchers

– Task from article

## Strength of claim

- Make sure the strength of the sentences matches the strength of the data and the arguments presented

## Strength of claim

### The findings

May well	Demonstrate		regulates	
	Show		*should regulate.../when	
	Indicate		can regulate	
			was regulated	
		that X	may regulate	
	Suggests		could regulate	Y
	Imply		might regulate	
	It appears	that X		

\* Caution should be exercised when extrapolating the short term findings to long term ...

Task