

Junior Year Writing Assignment 1: Science journalism article on the subject of ‘Do animal alarm calls express the Principle of Compositionality?’

➔ First draft due Thursday, September 26 ➔

Goals of Science Writers in General:

- **Explain or translate** difficult – but important – scientific concepts and findings and...
- **Generate interest** in an audience that doesn’t have formal training in the field.

Goals of this Junior Year Writing Project:

- Show that you understand what the Principle of Compositionality is and how it is a crucial part of human language.
 - Language involves morphemes (meaningful units), a way to put the morphemes together (syntax) and a way of relating the meaning of the whole to the meaning of the parts (Principle of Compositionality) given that syntactic structure.
- Show that you can determine whether a purported “language” in fact exhibits compositionality.
- Show that you can read primary literature critically.
- Gain understanding of a particular style of writing and explanation. Even if you never intend to be a science writer, the ability to explain a complex topic in more manageable terms is a very valuable skill to have.

1. Finding your audience (AKA, who you’re explaining things to and whose interest you’re trying to pique).

- Examples of science writing can be found in *National Geographic*, *Scientific American*, newspapers (*New York Times* ‘Science Tuesdays’), *Time*, and more.
- These materials will have educated readerships who haven’t read – and probably *cannot* read and understand – the original scientific literature on a subject.
- The readerships of magazines like *National Geographic* and *Scientific American* can be assumed to have some interest in science in general (or else, why would they be reading these magazines?) but may not already be interested in the topic you’re writing about.

2. Explaining and translating technical papers

2.1 Picking and understanding technical papers

→Your article must include discussion of at least two technical papers←

- You can choose any combination of technical papers that you like. The technical papers you will have to choose from are as follows:

Alarm calls in monkeys: <ul style="list-style-type: none">• ‘Monkey semantics: Two ‘dialects of Campbell’s Monkey Alarm Calls’¹• ‘Call combinations in monkeys: Compositional or idiomatic expressions?’• ‘Semantic combinations in primate calls’• ‘Campbell’s monkeys use affixation to alter call meaning’	Alarm calls in prairie dogs: <ul style="list-style-type: none">• ‘Size and shape information serve as labels’• ‘Prairie dog alarm calls encode labels about predator colors.’
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- As you read the technical papers you’ve chosen to write about, the following questions may help guide your organization of the ideas:

- What is the main conclusion the authors are arguing for?
 - What evidence do the authors’ present for this conclusion?
- Does the evidence they present warrant the conclusions they’ve drawn? If not, what additional evidence would it take to convince you that they’ve drawn the correct conclusions?
- Do the authors’ conclusions suggest that the animal alarm call system in question is “language” by our definition of it? In particular, how is – or isn’t – compositionality represented?

- You’re required to cite and discuss at least two of the technical papers above. If you’re interested in the prairie dog language issue, the following video (by the principal author of the papers we’ve given you) may be helpful as a supplement (not replacement) to the papers we’ve given you: <http://www.youtube.com/watch?v=y1kXCh496U0>

2.2 Expressing opinions vs. reading critically

- It is true that science writing generally has a more personal tone than the technical studies that it is discussing. However, while hooks (see below) may be personal, science writers don’t express personal opinions about the technical studies themselves.

¹ I recommend focusing on pages 1-21 (where most semantic discussion starts on pg. 16).

- It is fine to read technical articles with a critical eye – we encourage this, in fact! – but be prepared to back up your criticism with evidence (e.g., from supporting articles).

- What counts as “reading with a critical eye”? **It’s not the same thing as just “criticizing.”**
 - What data could the authors have collected that would potentially improve their argument? What data would damage their argument?
 - How does the authors’ reasoning or their conclusions stand up? Are there weaknesses in their line of argumentation?
 - Maybe you think the article is very strong. What makes the study strong and the conclusions convincing?

A good example of a critical yet professional piece is ‘Can a dog learn a word?’ – this was written as a response to ‘Word learning in a domestic dog’ by a scientist who was skeptical of the latter paper’s conclusions.

2.3 Translating terms and ideas for the reader

- When writing for a wider audience, we’re often told to avoid jargon. That is good advice! However, you may want to use at least a few technical terms. As long as you explain them, your audience will understand them. Think about the following questions:
 - What terms will be important for your article? What terms from linguistics are strictly necessary to understand compositionality?
 - What terms can be left out or paraphrased?
- “Translating” isn’t just about defining technical terms and concepts, but also about illustrating them. Some examples of how you could illustrate ideas like ‘compositionality’:
 - Can you think of a visual metaphor to illustrate what compositionality is?
 - What are some examples from real language of compositionality? What are some examples of non-compositional expressions?

2.4 Building a context for the reader (and yourself)

- One important aspect of “translating” and explaining technical materials is giving the audience a context for the research you’re reporting. Articles written for a specialized audience take a number of things as “given” which may not be at all obvious to the average reader.

- You can build up the context by consulting supporting articles.

→ You must cite at least one supporting article on compositionality! You can use other supporting materials as you see fit. ←

- Some supporting articles may be technical scientific reports, themselves. Other supporting articles may be more accessible overviews of, say, how linguists define the Principle of Compositionality.
- You should ask yourself, what is necessary background knowledge to the papers you've been given to report on? There are two major kinds of background knowledge useful for the reader.
 - **What are generally accepted as the characteristics of language? Specifically, what do linguists believe and know about compositionality?**
 - 'What Makes Us Smart? Core Knowledge and Natural Language.' E. Spelke.
 - 'Lexical Semantics and Compositionality.' B. Partee.
 - **What is potentially controversial about the research you are presenting? How does the research you are presenting fit into an ongoing controversy?**
 - Have linguists previously shown conclusively that animals have their own languages? If there is disagreement on this conclusion, how was this conclusion criticized?
 - A related (but not identical question): can animals acquire human language?
 - 'A telling difference'. Anderson.
 - 'Word learning in a domestic dog: Evidence for "fast mapping"'. Kaminski et al.
 - 'Can a dog learn a word?'. Bloom.

3. Generating interest

- You have some degree of interest in linguistics and semantics. Your readers may not...yet. Your job is to get them interested.
- This can start with a hook, or an opening line meant to draw the reader in.
 - Some hooks employed in the science journalism articles listed below include personal anecdotes, impressive or surprising facts, and snappy summaries of the central controversies.

- If you took LING 101, you were probably told not to do this in your essays. In science journalism, you're actually encouraged to have a catchy opener. However:
 - Don't spend more time thinking about this part than about the actual content of your article (AKA, clearly explaining the issues and articles)!
 - Don't use personal opinions about the articles as your hook (e.g., "Some truly terrible arguments have been made for X. For instance this article..."). Criticism or caveats must be backed up with reasons and evidence.

4. Working through an example

- Materials in this subsection are from Carl Zimmer's [website](#) from a workshop on science writing.

[Emergence of Fatal Avian Influenza in New England Harbor Seals](#). Journal of Microbiology.
[Flu That Leapt From Birds to Seals Is Studied for Human Threat](#). New York Times.

- Questions to ask about this pair of articles (from Zimmer):
 - What similarities in structure do you see between the journal article and the NYT article?
 - What is in the NYT story that was not in the paper?
 - What elements in the story are intended for a wide audience, as opposed to the narrower audience for the paper?
 - How does the story balance different views on the research?

4.1 What similarities in structure do you see between the journal article and the NYT article?

- Both introduce the surprising harbor seal deaths first and mention that usual causes for death (e.g., malnutrition) could be ruled out.
- Both then identify H3N8 as the responsible subvirus and identify its source (ducks); both tell the reader why this particular virus and infection incident are unique and deserving of special attention (i.e., the reader's attention).
 - **From NYT:** "Their research indicates that the virus evolved from bird flu, gaining the ability to spread from seal to seal — a real-life example of the transformation that scientists have been exploring in their labs."
 - *More detailed discussion of the seal/bird link comes later:*

“Within 24 hours, Dr. Anthony and his colleagues had discovered that all five seals carried an influenza virus...Within another 24 hours, the researchers had determined that the virus was a strain of the flu never seen in seals. The virus belongs to a flu subtype known as H3N8..They identified 37 mutations that set the seal virus apart from bird flu. A number of the mutations have been previously documented as important for flu viruses to adapt to mammal hosts.”

- **From MBio article:** “Unlike any previous outbreak in seals, this H3N8 virus has naturally acquired mutations that reflect adaptation to mammalian hosts and that are known to increase virulence and transmissibility in avian H5N1 viruses infecting mammals. The virus has further acquired the ability to use the SA-2,6 receptor commonly found in the respiratory tracts of mammals, including humans.”
- Finally, both discuss the relationship between the seal outbreak and potential dangers to humans.
 - **From NYT:** “If it adapts better to mammal hosts, it may well start to move into humans,” Dr. Lipkin said. “This is clearly a virus for which we need some surveillance.”...Dr. Lipkin and his colleagues found evidence that seal cells can also be invaded by both kinds of viruses — raising the possibility that they could produce new hybrid flu strains as well.
 - **From MBio article:** “Further studies will be required to establish the functional significance of these substitutions; however, the natural epizootic emergence at this time of a pathogenic virus that can transmit between mammals, found in a species that can become infected with multiple influenza virus subtypes, must be considered a significant threat to both wildlife and public health.

4.2 What is in the NYT story that was not in the paper?

- **Historical and current events context:**

“Four times in the past century...”, “Scientists have recently been tinkering with a strain of bird flu...when news of their efforts emerged last fall, a fierce debate broke out about the wisdom of publishing the experiments.”, “There had been a few documented flu outbreaks in seals, the most recent having hit in 1992.”, “H3N8 viruses have crossed over from birds to dogs and horses several times since 1960.”

- **Background on flu:** “All human flu strains evolved from flu viruses that live in birds...”

- **Comments from other researchers:** “ ‘It’s a beautiful study,” said Eddie Holmes, an expert on flu evolution...Dr. Holmes wanted to see more evidence for the idea that flu viruses can mix in seals. He also pointed out that H3N8 has never crossed from dogs or horses to people.”

Note! The outside expert introduces the controversy (how likely is it that the flu will cross over to humans) and presents an alternative to the position advocated in the scientific article (i.e. that this finding is a cause for great concern).

4.3 What elements in the story are intended for a wide audience, as opposed to the narrower audience for the paper?

- Historical and current events context; background on flu
 - Scientists who are reading an article on flu know about the recent controversies with mutating strains of flu in the lab, and they know where human flu strains evolved from.
- Comments from outside experts to temper the scariness of the story.
- Information about what the scientists will be doing next (looking for more infected seals).

4.4 How does the story balance different views on the research?

- **See above:** discussion cited both from original article's lead author, and from another expert in the field with conflicting views about the original authors' conclusions.

5. Additional example articles

We've tried to stick with articles that have something to do with language or brains, but you could also look to articles on other topics for inspiration.

[Teenage Brains](#). National Geographic.

[They're, Like, Way Ahead of the Linguistic Currve](#). NYT.

[A Lesson in Linguistics From the Mouths of Babes](#). NYT.

[Brain's Drain: Neuroscientists Discover Cranial Cleansing System](#). Scientific American.