SP1541
Exploring Science Communication through Popular Science

Post Lesson Students' Notes
Week 3

AY 2022/2023 Semester 1

Learning Outcomes

By the end of this week, you should be able to:

- identify the choice of **argumentative** writing style made by a popular science writer (Richard Dawkins) and describe its impact on readers;
- identify and explain **deontological** appeal used in popular science writing to secure and sustain readers' interest;
- analyse and describe **Moves 1- 2** that are conventional to introducing a news article;
- analyse and apply the use of **explanatory strategies (definition, description, metaphors)** to explain scientific concepts and ideas for non-specialist readers,
- analyse and apply the writer's use of **evaluative language (expectedness, possibility)** for promoting the news article; and
- apply your learning to review your Pre-course News Article.

Here are some key concepts in science communication that you would have been introduced to in the tutorials you attended this week:

I. Deontological appeal

A deontological argument attempts to praise or excoriate something by attaching it to a category that has a recognized value for an audience. In science popularization, all references to the amazing powers and secrets of nature or of the breakthroughs and accomplishments of the scientists themselves are basically deontological appeals. How do deontological appeals work?

Deontology is concerned with the intrinsic nature/value of an act (as opposed to, say, its consequences). **Deontological appeals often draw on the assumption that there is basic value (goodness) in an act** (e.g. the act of inquiring into our existence or into the origin of life, the act of demystifying a phenomenon, and the act of confirming a guess). Emphasizing the **uniqueness of a subject or a sense of wonder/awe** is typical of deontological appeals. Deontological appeals are often contrasted with teleological appeals.

Teleological appeals are concerned with the **consequences, ends, or applications of an act and often claim that something has value because it leads to further benefits.**

In the tutorials this week, we saw how Dawkins used deontological appeals to influence us to be curious about the origin of life. We also saw how Connor (2013) used both deontological and teleological appeals to get us to believe that Jennifer Doudna's discovery is worthy of our interest and attention because it debunks a myth (of junk DNA) and has important consequences for genetic engineering.

II. Moves in science news articles

In Week 3 Tutorial 1, you were introduced to **two moves** that science news writers typically use to **grab readers' attention or raise readers' interest in the topic**:

Move 1: Introduce the key finding

This is often seen in the headline, the lead or the first section of the news article. Connor (2013) declares 'what' the news article will be about CRISPR studied by Dr. Jennifer Dounda and Dr. Emmanuelle Charpentier -- a technique that has been assumed to be junk DNA is found to be useful in transforming medicine.

In addition to introducing the key finding (what the news article will be about), news authors often use this move to entice readers to read the article. In Connor's (2013) article, you saw how this was achieved by means of an expert testimony in the headline. CRISPR was introduced as an example of a scientific discovery that is often hidden away in plain sight for many years before its importance is fully realised.

Move 2: Describe significance of the key finding

Writers often describe a major significance of the key finding in the lead and/or the first section of the article as a way of attracting attention to the result with elevated importance and urgency. In the case of Connor (2013) we know what this major significance is – potential for transforming medicine, the holy grail of genetic engineering. Significance and implications may also be further discussed towards the end of the article, but the purpose is somewhat different. We will explore that in later tutorials, under Move 8.

III. Explanatory strategies

In addition to moves for organizing meaning, we have learnt a few **explanatory strategies** that Connor (2013) used to communicate science and write about CRISPR with comprehensibility and clarity:

- **Definition** (e.g. the same backwards as forwards) is used to explain **unknown words** (palindromic order).

- **Description** (e.g. "a way of storing the genetic information of an invading virus in the form of a palindromic DNA sequence") is used to explain **unknown things**. Descriptions may provide insight about composition, quantity, size, localization, time, properties, process, context, functions, cause, consequence, etc.

- **Analogies and metaphors** link scientific phenomena with everyday phenomena that are better known to educated readers as comparison. The use of a metaphor/an analogy employs the visual picture of a description that is common or easily identifiable with readers such that that description is simply understood without much cognitive effort.

  Analogies and metaphors **express comparison and highlight similarities** between two objects or phenomena (Duit, 1991). They can be defined as understanding, interpreting, and experiencing one concept or phenomenon in terms of another one. This is achieved through mapping relationships between a target domain (i.e. an unfamiliar/abstract concept or phenomenon) and a source domain (i.e. a familiar/concrete concept or phenomenon). An analogy explicitly compares the structure of the two domains and draws a conclusion from the direct comparison, while a metaphor implicitly compares the features that match in the two domains (Duit, 1991).

  In Connor's (2013) article, the source domain "a pair of molecular scissors" is mapped onto the target domain "CRISPR-Cas9" (i.e. an enzyme which can cut the two strands of DNA at a specific location in the genome). "Molecular scissors" is used as a metaphor to explain CRISPR-Cas9's main function

of cutting DNA. However, this metaphor does not address CRISPR-Cas9's ability to insert, replace or delete DNA.

The following provides you with the definitions of terms associated with CRISPR-Cas9 and a video explains how CRISPR-Cas9 can modify, delete or correct specific areas of DNA in order to treat diseases. http://www.crisprtx.com/gene-editing/crispr-cas9

Reference

Duit, R. (1991). One the role of analogies and metaphors in learning science. *Science Education, 75* (6), p.649-672. https://doi.org/10.1002/sce.3730750606

IV. Evaluative language

News articles often contain a promotional or selling dimension to affect readers to take an interest and continue reading. Such promotion is often premised upon certain value parameters. In Connor's (2013) article, we encountered two such parameters:

- **Expectedness** (e.g. "CRISPR is not junk DNA" – contrary to popular expectation)
- **Possibility** (e.g. "It could transform medicine")

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