

### Activity A (in pairs)

Theme: When people make explanations, you may look at how they attempted to identify or locate the causation and *consider alternative styles of causal explanation*. If a scientist is emphasizing, say, a unitary cause, such as a breast cancer gene, consider the multiple factors they are excluding.

1. Francis Galton collected data on parents and offspring, e.g., if a parent has synesthesia (i.e., a condition where one sense co-activates other senses) that more likely in the offspring; if a parent rows in the crew at Oxford, is that more likely for the offspring. What kind of explanation could he claim from such data? What alternative style of explanation can you come up with (which would require additional or different data)?
2. HIV causes AIDS as is affirmed by the use of antiretrovirals to keep HIV+ subjects from succumbing to AIDS. Does that mean that HIV is the explanation for why AIDS became so widespread in Uganda and later in South Africa? Again, what alternative style of explanation can you come up with (which would require additional or different data)?
3. The 1918 flu pandemic (c. 50 million deaths) involved a version of the H1N1 virus. However, if someone points out the disproportionate mortality from the 1918 flu in the USA of African-Americans, what alternative style of explanation can you come up with (i.e., other than the virus caused it) (which would require additional or different data)?
4. If someone's car was swept off a bridge during a powerful storm of the kind that are becoming more frequent in recent years, what would you attribute the cause of the passengers who drowned? (Many different kinds of explanation could be envisaged.)
5. Women with a certain variant of the BRCA1 gene are more likely to get breast and ovarian cancer. Women who have not been pregnant are more likely to get ovarian cancer. Women who are born in the 1940s and 50s are more likely to get breast cancer than women who were born in the early 20<sup>th</sup> century. Age-adjusted new female breast cancer cases have been rising on average 0.3% each year over the last 10 years. Age-adjusted rates for new ovarian cancer cases have been falling on average 1.5% each year over the last 10 years. As countries transition towards higher levels of human development, their cancer burden will not only increase, but the types of cancer observed will also change. Is BRCA1 a cause of breast and ovarian cancer? What else is a cause?
6. The world's population is increasing. What is the cause of that? The rate of increase is decreasing. What is the cause of that? Some countries have seen earlier or more rapid declines in growth rate than others? What is the cause of that?
7. Beriberi is a disease that people get when they have insufficient thiamine (vitamin B1). Vorderman showed that it is more common in some prisons than others. What does his data show us about how to counteract beriberi. What does that say about the cause of beriberi. Was Vorderman able to use his knowledge to eliminate beriberi in prisons? What does that say about the cause of beriberi?

8. The nine states in the USA that rank lowest in terms of gun prevalence are the very same nine that rank lowest for suicide rates. Similarly, the three states top-ranked for gun prevalence can be found among the four states ranking highest for suicide rates. Across the world, the rates of suicide and of clinical depression are not well correlated. (For example, Russia has high rates for both, but North Africa has high rates for depression, but not for suicide.) What kinds of explanation for suicide fit with such data? What alternative style of explanation can you come up with (which may require additional or different data)?

Activity B (in different pairs)

B1. For each of the cases you looked at in A, what could someone do to influence the situation (e.g., the incidence of the disease)? How does your answer vary according to what style of causal explanation you considered? When does your answer about explanations and causes get changed or adjusted after considering what someone could do?

B2. In what ways do your B1 answers affirm the following theme?

- The causes proposed reflect the social actions desired or supported given that
  - the categories used (and thus data collected)
  - assumptions needed to make causal claims from patterns
    - are places where social assumptions can influence the scientist's decision, and
    - science cannot be done without decisions in these areas.