

Chapter 3 Exercises

1. Consider the following variables. State whether each is binary, ordinal, or continuous.
 - a. Income level
 - b. Native English speaker
 - c. Blood lead concentration
 - d. Poverty
 - e. Minutes of exercise per day
 - f. Sex
 - g. BMI category
 - h. Number of cigarettes smoked per day
 - i. Percent living below the poverty line
 - j. Legalization of marijuana in state of residence

2. Classify the following exposures as acute, chronic, intrinsic, or time-varying.
 - a. Hours of sunlight exposure per day
 - b. Exposure to particulate matter from the collapse of the World Trade Center
 - c. Dietary supplement use over past 10 years
 - d. Death of a spouse
 - e. Adult height
 - f. Folic acid deprivation in early gestation
 - g. Exposure to electromagnetic fields from living next to high-voltage power lines
 - h. Country of birth
 - i. Premature birth
 - j. Exposure to fluoride in drinking water

3. Identify the critical window and latency period in each of the following examples.
- a. Diethylstilbestrol (DES) is a synthetic estrogen that was prescribed to an estimated 3 million pregnant women in the United States from about 1940 to 1970 in the mistaken belief that it prevented pregnancy complications and miscarriage. In 1971, Arthur L. Herbst, an observant obstetrician and gynecologist, noticed a cluster of eight cases of adenocarcinoma of the vagina in adolescent women between the ages of 15 and 22—an extremely unusual occurrence. He discovered that seven of the eight mothers had been treated with DES during the first trimester of their pregnancies. (Herbst AL, Ulfelder H, Poskanzer DC. Adenocarcinoma of the vagina. Association of maternal stilbestrol therapy with tumor appearance in young women. *New England Journal of Medicine*. 1971;284(15):878-81.)
- Critical window:
- Latency period:
- b. Between 1995 and 1997, more than 17,000 adults (mean age 56) were enrolled in a study financed by the Centers for Disease Control and Prevention and administered by Kaiser Permanente in which participants were asked to recall adverse childhood experiences (ACEs) and questioned about their current behaviors and health status. Binary outcome measures (present/absent) for ten categories of abuse, neglect, and household dysfunction experienced before age 18 were tallied to create an ACE score. Findings include associations between ACE score and risk of current smoking, depression, alcoholism, serious financial problems, ischemic heart disease, emphysema, any cancer, stroke, and diabetes, among others. (For more information on the Adverse Childhood Experiences (ACE) Study, visit www.cdc.gov/ace)
- Critical window:
- Latency period:
- c. Huntington's chorea is a devastating neurodegenerative disease caused by an autosomal dominant mutation of the Huntingtin gene. Any child of an affected person has a 50% chance of inheriting the gene for the disorder. Initial symptoms, which include random, uncontrolled spasmodic movements, may appear at any time, but most commonly manifest between ages 35 and 44. Cognitive and psychiatric problems ensue, eventually leading to dementia and early death.
- Critical window:
- Latency period:

4. You are interested whether video game playing increases adolescent risk-taking behavior. Discuss different ways in which “video game playing” could be measured, considering the way in which the data would be collected, the time frame of measurement, the type of video games of interest, and any other relevant information.
5. Table 1 below shows results obtained in determining the validity of self-report of drinking to the point of functional impairment (being under the influence, or UI). 1,000 persons who had recently drunk alcohol were asked whether or not they felt impaired and gave blood samples, which were then analyzed for alcohol content. The “gold standard” used to define functional impairment was a blood alcohol content of $\geq 0.08\%$, the cutoff for DUI in all 50 states. The results are as shown below. Compute and interpret the sensitivity and specificity of self-reported impairment vs. the gold standard.

Table 1.

	Blood alcohol level		
	$\geq 0.08\%$	$< 0.08\%$	Total
Reported UI	119	17	136
Reported not UI	370	494	864
Total	489	511	1000

Sensitivity =

Specificity =