

Stat 1040, Recitation packet 1

1. A 1999 study claimed that

Infants who sleep at night in a bedroom with a light on may be at higher risk for myopia (nearsightedness) later in childhood.

The researchers surveyed parents of 479 children aged 2 to 16 seen in the ophthalmology outpatient department of a children's hospital. A questionnaire asked about the child's nighttime light exposure at the time of the survey and before age two. They noticed a positive association between myopia and nighttime light exposure.

- (a) Explain how you know that this is an observational study.
 - (b) Explain why this is *not* strong evidence that sleeping with a light on *causes* myopia by suggesting a possible confounding factor and explaining clearly how this confounding factor could account for the association they observed.
2. The following paragraph appears on the website www.alternative-medicine-and-health.com

Elmer Cranton, M.D., in his book, "Bypassing Bypass", indicates that a ten year, 24 million dollar study conducted by the National Heart, Lung and Blood Institute, which screened 16,000 patients who underwent coronary artery bypass at eleven leading medical centers, revealed no increase in post-surgical survival rates as compared with a matched group of non-surgically treated patients.

You may assume that the "matched group" was selected to resemble the original 16,000 with respect to age, sex and type of heart disease.

- (a) Based on what you read in the paragraph, was the study randomized? Explain clearly.
 - (b) Was the study blind? Explain clearly.
 - (c) Explain the major problem with a study such as this one, and why it would probably not give very reliable results.
3. A recent study in Europe looked at a large group of women of childbearing age. The researchers asked each woman how much alcohol they had consumed over the past 12 months. The researchers found that women who drank moderate amounts of alcohol were somewhat less likely to have infertility than women who did not (November, 2001). The study said it "controlled for age, income and religion".
 - (a) Based on the information above, was this a controlled experiment or an observational study?
 - (b) Why did they "control for" age, income and religion?
 - (c) Is this convincing evidence that infertility would decrease if women with infertility started to drink moderate amounts of alcohol? (Note: we are only asking about infertility. There may be other problems introduced by such behavior, but ignore these for answering this question).
 - (d) Suggest a possible confounding factor (other than age, income, or religion) and clearly explain why you think it might be a confounding factor.
 4. A randomized, controlled, double-blind study published in March, 2008 shows the well-known "placebo effect" works even better if the placebo costs more. In the study, volunteers were given an electric shock and took a pill. Volunteers in the treatment group were told it was an expensive painkiller, while those in the control group were told it was a discounted painkiller. In fact, all the pills were placebos, but 85% of the volunteers who thought they were getting an expensive painkiller said they felt less pain after taking it, compared to 61% of those who thought they were getting a discounted painkiller.

What is a placebo and why is it used in a controlled experiment?

5. Here is the beginning of an article from the YAHOO Health News web site on January 7, 1998:

“Wednesday January 7, 1998 For Yahoo News by Reuters

Daily Two–Mile Walk Halves Death Risk

NEW YORK (Reuters) — Walking two miles or more per day can cut the overall risk of dying in half, according to a new study. It also reduces the risk of dying from cancer — and appears to cut the risk of death due to cardiovascular diseases, US researchers report. Between 1980 and 1982, multicenter researchers in the Honolulu Heart Program studied 707 nonsmoking, retired men, aged 61 to 81 years, and collected mortality data on these men over the following 12 years. During the study, 208 of the men died. The study results show that while 43.1% of men who walked less than one mile per day died, only half this figure – 21.5% – of the men who walked more than two miles per day died.”

- (a) Is the research described in the article an experiment or an observational study?
- (b) List two different possible confounding factors that are likely to have an effect on the outcome of this study. Carefully explain exactly why you think these are confounding factors.
- (c) Based on the description in the body of this article, is the headline (“Daily Two–Mile Walk Halves Death Risk”) justified? **Yes** or **No**? Circle your answer and give a brief explanation.

6. Read the following news article:

“Wrap up” advice to stop colds

Scientists say cold noses reduce ability to fight virus attacks

Monday, November 14, 2005; Posted: 4:47 p.m. EST (21:47 GMT)

LONDON, England (CNN) – British researchers into the common cold say “catching a chill” really does help colds develop – and are advising to “wrap up warm” to keep viruses at bay.

Mothers and grandmothers have long warned that chilling the surface of the body, through wet clothes, feet and hair, causes common cold symptoms to develop. But much previous research has dismissed any link between chilling and viral infection as having no scientific basis.

Now researchers in Cardiff, Wales, say they can prove drops in temperature to the body really can cause a cold to develop.

Claire Johnson and Professor Ron Eccles, from Cardiff University’s Common Cold Center, recruited 180 volunteers, half of whom they got to immerse their feet in ice and cold water for 20 minutes.

The other 90 in tests during the common cold “season” sat with their feet in an empty bowl.

During the next four or five days, almost a third (29 percent) of the chilled volunteers developed cold symptoms – compared to just 9 percent in the control group, the scientists said.

- (a) Is this an observational study or a designed experiment? Explain briefly.
- (b) What is the “treatment” in this study?
- (c) The article does not say how the researchers divided up the 180 people into two groups of 90. How *should* they do this? Explain clearly.
- (d) Is the study blind? Explain briefly.
- (e) Are there any possible confounding factors or problems with the study? Explain clearly.