
Question 1.1 An ad for ADT Security Systems says,

“When you go on vacation, burglars go to work [...] According to FBI statistics, over 25% of home burglaries occur between Memorial Day to Labor Day.”

Do the data in the ad support the claim that burglars are more likely to go to work during the time between Memorial Day to Labor Day? Please explain your answer. **(6 Points)**

Note: You can assume that “over 25%” means only slightly over. Had it been much over, say closer to 30%, then the marketers would have said so.

Note: Memorial Day is observed on the last Monday of May and Labor Day is observed on the first Monday of September.

I don't think the data support the claim because 25% over a 3-month period (Memorial Day to Labor Day spans approximately 3 months) is what we'd expect if burglaries were evenly distributed throughout the year, meaning burglars are just as active during the other 9 months.

Question 5.1. The data were gathered by the following procedure, reported in the study. “Between January and June 1998, parents of children aged 2-16 years [...] that were seen as outpatients in a university pediatric ophthalmology clinic completed a questionnaire on the child’s light exposure both at present and before the age of 2 years.” Was this study observational, or was it a controlled experiment? Explain. **(5 Points)**

Researchers gathered data by surveying parents about their children’s past and present light exposure. They did not assign children to different light exposure conditions or control their environments. Since the study relies on naturally occurring variations in light exposure rather than an experimental intervention, it qualifies as an observational study.

Question 5.2. The study found that of the children who slept with a room light on before the age of 2, 55% were myopic. Of the children who slept with a night light on before the age of 2, 34% were myopic. Of the children who slept in the dark before the age of 2, 10% were myopic. The study concluded the following: “The prevalence of myopia [...] during childhood was strongly associated with ambient light exposure during sleep at night in the first two years after birth.”

Do the data support this statement? Why or why not? You may interpret “strongly” in any reasonable qualitative way. **(5 Points)**

No, the data do not strongly support this statement. The data suggest an association between early-life ambient light exposure during sleep and childhood myopia, but they do not strongly support a causal relationship. While they show an association, the study is observational and does not establish causation. Other factors, such as genetics and lifestyle, could explain the observed pattern. Because the study does not control for these confounding variables. Therefore, while the claim that myopia is “strongly associated” with light exposure is supported to some extent by the data, it remains inconclusive without further controlled research.

Question 5.3. On May 13, 1999, CNN reported the results of this study under the headline, “Night light may lead to nearsightedness.” Does the original study claim that night light causes nearsightedness? (5 Points)

No, the original study does not claim that night light causes nearsightedness. The study only found an association between nighttime light exposure before age 2 and higher rates of childhood myopia. Since it was an observational study, it could not establish causation. Other factors could explain the relationship like i said before. The CNN headline, “Night light may lead to nearsightedness,” suggests a causal link that the study did not prove.

Question 5.4. The final paragraph of the CNN report said that “several eye specialists” had pointed out that the study should have accounted for heredity.

Myopia is passed down from parents to children. Myopic parents are more likely to have myopic children, and may also be more likely to leave lights on habitually (since the parents have poor vision). In what way does the knowledge of this possible genetic link affect how we interpret the data from the study? Explain. **(5 Points)**

The genetic link affects how we interpret the study because myopic parents are more likely to have myopic children and may also use night lights more often. This means the association between light exposure and myopia could be due to genetics rather than the light itself. Since the study did not account for heredity, it cannot prove that night lights cause myopia, only that they are linked. More research is needed to determine the true cause.

