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.

Type your answer here, replacing this text.

SOLUTION: No. Labor Day is around 14 weeks after Memorial Day, so the period between them is a bit more than 25% of the year ($14/52 \sim= 26\%$). 25% of burglaries happening in 25% of the year does not imply a higher rate of burglary in the summer.

Question 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 Point)**

Type your answer here, replacing this text.

SOLUTION: It was an observational study. The researchers didn't perform any intervention.

Question 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 that, "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)**

Type your answer here, replacing this text.

SOLUTION: Yes. There is a big difference in myopia rates between the groups.

Question 3. On May 13, 1999, CNN reported the results of this study under the headline, "Night light may lead to nearsightedness." Does the conclusion of the study claim that night light causes nearsightedness? **(5 Points)**

Type your answer here, replacing this text.

SOLUTION: No. The study (as quoted above) claimed only an association.

Question 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)**

Type your answer here, replacing this text.

SOLUTION: If myopic parents are more likely to have myopic kids *and* leave the lights on at night, then myopic kids are more likely to have lights on at night. It is then reasonable to assume that myopic parents are a potential confounding factor that the observational study did not account for. However, we can still find the observed association even if there is no causal effect of night lights on child myopia.