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.

The data in the ad does not support the claim. The time period from last Monday of May and first Monday of September is slightly over 25% of a year. This is consistent with the 25% in the data . And this is consistent with burglaries occurring at a constant rate throughout the year.

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 Points)**

The study is observational since there are no groups like control group and experimental group. The clinic also did not perform any treatment to the patients. The study only gathers data by conducting a survey thus the study is observational.

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 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)**

The data supports this statement. The statement uses the word "associate," thus implying correlation rather than causation. Of the children who slept with different lights, room light had the highest percentage of 55%, and dark had the lowest percentage of 10%. Night light is in between. We can see that the percentage decreases when light exposure decreases.

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)**

The conclusion of the study did not claim that night light causes nearsightedness. The original study claimed there is an association or correlation, but it did not mention causation. The study's conclusion also used the word "ambient light exposure" instead of "night light" directly.

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)**

Knowledge of this possible genetic link serves as a confounding factor of the study. Since this variable is not controlled and measured in the study, we should view the conclusion of the study more carefully to avoid spurious association. Children who slept with room lights might have a myopic parents since myopic parents are more likely to leave lights on habitually. These kinds of factors will affect our conclusion.