**Thinkful Drill – Formulating Good Research Questions**

**What does a good research question look like?**

The research question will guide your model-building and data exploration by spotlighting variables and inter-variable relationships of particular interest.

Different types of research questions also call for different types of models. Research questions about odds or likelihood, such as "will it rain today in Omaha?", use models specifically designed to deal with binary outcomes (either it rains or it doesn't). Research questions about quantity, such as "how much will it rain?", use models that deal with continuous outcomes.

Characteristics of a good research question include:

* *What sort of data, or ways to collect data, are available to me on this topic?*
  + A research question without relevant data is simply speculation.
* *What skills do I have?*
  + A research question should be addressable using the statistical and programming skills you have now, or can feasibly learn in the time budget you have.
* *Can this question be answered using quantities or probabilities?*
  + Since the plan is to address this research question using a mathematical model, it must be amenable to a numeric solution.
* *Can this research question be asked in one sentence*?
  + If you need more than one sentence to explain what you want to know, your question is probably too broad or too vague to be useful and needs refining.

**Exercise:**

Categorize each of the following research questions as "good" or "bad", and provide alternative formulations for the bad ones. Save your responses in a document of some kind, submit a link below, and discuss your reasoning with your mentor.

1. What is the 1994 rate of juvenile delinquency in the U.S.?

Bad – What are the key factors that contributed the most towards the 1994 rate of juvenile delinquency in the U.S.?

1. What can we do to reduce juvenile delinquency in the U.S.?

Bad – What types of programs lead to a reduction in juvenile delinquency in the U.S.?

1. Does education play a role in reducing juvenile delinquents' return to crime?

Good

1. How many customers does AT&T currently serve in Washington, DC?

Bad – What incentives/promotions are provided in Washington, DC and how does that correlate to number of customers?

1. What factors lead consumers to choose AT&T over other service providers?

Good

1. How can AT&T attract more customers?

Bad – What are the key factors that attract customers to AT&T?

1. Why did the Challenger Shuttle explode?

Bad – What factors contributed to the Challenge Shuttle explosion?

1. Which genes are associated with increased risk of breast cancer?

Good

1. Is it better to read to children at night or in the morning?

Good

1. How does Google’s search algorithm work?

Bad – How does Google organize their search results based on input?