1a – A Guide to
Hypotheses

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Hypotheses are simple statements that a researcher uses in the early stages of a piece of research to state how their data may create a conclusion. They should not be viewed as a prediction but instead a proposed explanation based on the limited evidence the researcher already has or based on the geographical theories about which the researcher has already read.

They are used to give focus to the research and are particularly useful in statistical tests. In these, it is often the case that a **Null Hypothesis** is used. This is a statement which goes against the general trends or theory that is already known. In empirical research, such as that carried out by most geographers in the field, it is ultimately impossible to prove truth exists. As such it would be very wrong for the geographer to claim to have found a positive statement (an **alternative hypothesis**) to be true. In fact, all they have done is simply proven that a false statement is not true. Geographers who consider this line of thinking challenging should think about a criminal court in which a person on trial has to be assumed innocent until proven guilty. It is the prosecutor's job to prove guilt not to prove innocence. In the same way, one's data has to be considered false until a known falsehood has been proven as such.

The null hypothesis therefore serves as a means of allowing geographers to draw conclusions when data, by its nature, cannot provide absolute truths.

For example, geographical theory suggests that the bedload of a river should decrease in size with distance from the source of the river. Therefore, a sensible positive or alternative hypothesis (shown as the symbol H_1) would be

> H_1 :   "The size of the bedload in River X is directly correlated to the distance in which it is found from the source."

However, a good researcher should not look to prove true a statement they suspect to be true to begin with. Instead they should prove a false and opposite statement to in fact be false first. Therefore, a null hypothesis (shown by the symbol H_0) should also be quoted: giving the geographical researcher scope to conclude that a false statement is indeed false.

> H_0 :   "The size of the bedload in River X is in no way correlated to the distance in which it is found from the source."

In the process of the investigation the researcher is tasked with finding the evidence to reject the null hypothesis, usually through the use of statistical tests such as **Chi-Squared** or **Spearman's Rank Correlation Coefficient**.

For example:

"The results show a negative correlation between the size of the bedload and the distance from the source. This allows me to reject my null hypothesis which states that there would be no such correlation and therefore accept my alternative hypothesis."