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Variables, Hypothesis & Theory

1. Independent Variable (IV): This is the variable that is manipulated or controlled by the researcher. It's the cause in a cause-and-effect relationship and presumed to have a direct effect on the dependent variable. For example, in an experiment testing the effect of different doses of a drug on blood pressure, the independent variable would be the dose of the drug.

2. Dependent Variable (DV): This is the variable that is measured and affected by the independent variable. It's the effect in a cause-and-effect relationship. In the drug example, the dependent variable would be the blood pressure.

3. Types of Variables:

- **Independent Variable:** Manipulated by the researcher.
- **Dependent Variable:** Measured by the researcher; its value depends on the independent variable.
- **Control Variable:** Variables that are kept constant or controlled to prevent them from influencing the relationship between the independent and dependent variables.
- **Confounding Variable:** Variables other than the independent variable that may affect the dependent variable, leading to spurious correlations.

4. Hypothesis: This is a testable statement or prediction about the relationship between two or more variables. It's typically formulated based on existing knowledge or theory and guides the research. For example, "Increasing the dose of the drug will lead to a decrease in blood pressure."

5. Theory: This is a well-substantiated explanation of some aspect of the natural world that is based on a body of evidence. Theories are broader in scope than hypotheses and are supported by substantial evidence from various sources. They explain why certain phenomena occur.

In some research, hypotheses may not be needed, particularly in exploratory or descriptive studies where the goal is to understand a phenomenon rather than test a specific hypothesis. Additionally, in qualitative research, hypotheses are less common as the focus is often on understanding the depth and complexity of a situation rather than testing specific predictions.