

Lebanese University

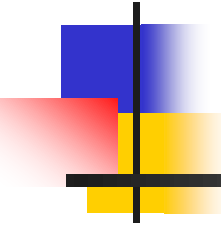
Faculty of Information (BRANCH II)

MARKETING RESEARCH

DATA SCIENCE PROGRAM

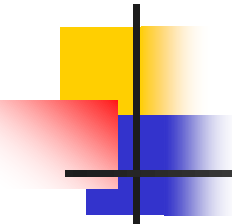
1st Semester 2023-2024

Dr. Ziad F. Haddad



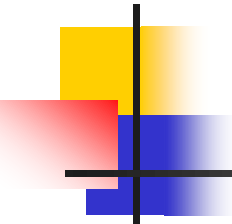
Chapter Six

Experimentation and Causal Research



Chapter Outline

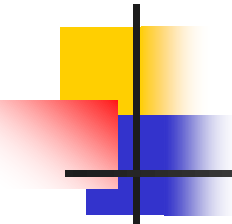
- 1) Overview**
- 2) Concept of Causality**
- 3) Conditions for Causality**
- 4) Definition of Concepts**
- 5) Definition of Symbols**
- 6) Validity in Experimentation**
- 7) A Classification of Experimental Designs**



Concept of Causality

A statement such as "X causes Y " will have the following meaning to an ordinary person and to a scientist.

<u>Ordinary Meaning</u>	<u>Scientific Meaning</u>
X is the only cause of Y.	X is only one of a number of possible causes of Y.
X must always lead to Y (X is a deterministic cause of Y).	The occurrence of X makes the occurrence of Y more probable (X is a probabilistic cause of Y).
It is possible to prove that X is a cause of Y.	We can never prove that X is a cause of Y. At best, we can infer that X is a cause of Y.



Conditions for Causality

- **Variation** is the extent to which a cause, X , and an effect, Y , occur together or vary together in the way predicted by the hypothesis under consideration.
- The **time order of occurrence condition** states that the causing event must occur either before or simultaneously with the effect; it cannot occur afterwards.
- The **absence** of other possible **causal factors** means that the factor or variable being investigated should be the only possible causal explanation.

Evidence of Variation between Purchase of Fashion Clothing and Education

Purchase of Fashion Clothing, Y

		High	Low	
Education, X	High	363 (73%)	137 (27%)	500 (100%)
	Low	322 (64%)	178 (36%)	500 (100%)



Purchase of Fashion Clothing By Income and Education

Low Income Purchase

High

Low

High	122 (61%)	78 (39%)
Low	171 (57%)	129 (43%)

200 (100%)

300 (100%)



High Income Purchase

High

Low

High	241 (80%)	59 (20%)
Low	151 (76%)	49 (24%)

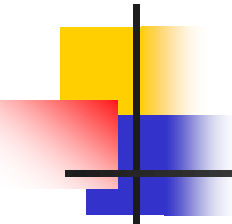
300

200

Education
High
Low

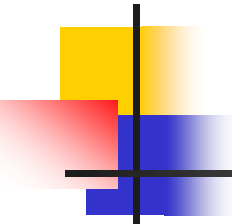


Education
High
Low



Definitions and Concepts

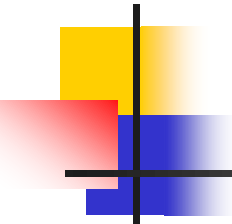
- **Independent variables** are variables or alternatives that are manipulated and whose effects are measured and compared, e.g., price levels.
- **Test units** are individuals, organizations, or other entities whose response to the independent variables or treatments is being examined, e.g., consumers or stores.
- **Dependent variables** are the variables which measure the effect of the independent variables on the test units, e.g., sales, profits, and market shares.
- **Extraneous variables** are all variables other than the independent variables that affect the response of the test units, e.g., store size, store location, and competitive effort.



Experimental Design

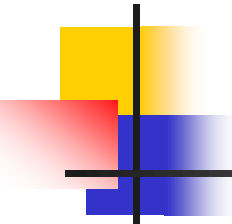
An **experimental design** is a set of procedures specifying:

- the **test units** and how these units are to be divided into homogeneous subsamples,
- what **independent variables** or treatments are to be manipulated,
- what **dependent variables** are to be measured, and
- how the **extraneous variables** are to be controlled.



Validity in Experimentation

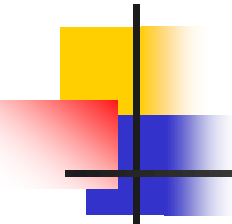
- **Internal validity** refers to whether the manipulation of the independent variables or treatments actually caused the observed effects on the dependent variables. Control of **extraneous variables** is a necessary condition for establishing internal validity.
- **External validity** refers to whether the **cause-and-effect relationships** found in the experiment can be generalized. To what populations, settings, times, independent variables and dependent variables can the results be projected?



Statistical Designs

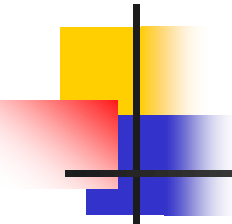
Statistical designs consist of a series of basic experiments that allow for statistical control and analysis of external variables and offer the following advantages:

- The effects of more than one independent variable can be measured.
- Specific variables can be statistically controlled.
- Economical designs can be formulated when each test unit is measured more than once.



Limitations of Experimentation

- Experiments can be time consuming, particularly if the researcher is interested in measuring the long-term effects.
- Experiments are often expensive. The requirements of experimental group, control group, and multiple measurements significantly add to the cost of research.
- Experiments can be difficult to administer. It may be impossible to control for the effects of the independent variables, particularly in a field environment.
- Competitors may deliberately use or change the results of a field experiment.



Criteria for the Selection of Test Markets

Test Markets should have the following qualities:

- 1) Be large enough to produce meaningful projections. They should contain at least 2% of the potential actual population.**
- 2) Be representative demographically.**
- 3) Be representative with respect to product consumption behavior.**
- 4) Be representative with respect to media usage.**
- 5) Be representative with respect to competition.**
- 6) Be relatively isolated in terms of media and physical distribution.**
- 7) Have normal historical development in the product class**
- 8) Have marketing research and auditing services available**
- 9) Not be over-tested**



Next: Chapter Seven

Measurement and Scaling