MENGIDENTIFIKASI VARIABEL

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What is a variable?

Whether we accept it or not, we all make value judgements constantly in our daily lives: ‘This food is *excellent*’; ‘I could not sleep *well* last night’; ‘I do not *like* this’; and ‘I think this is *wonderful*’. These are all judgements based upon our *own* preferences, indicators or assessment

Let us consider this in a professional context:
‘This programme is *effective*.’
‘This programme is *not effective*.’
‘We are providing a *quality* service to our clients.’
‘This is a *waste of time*.’
‘In this institution women are *discriminated* against.’
‘There is no *accountability* in this office.’
‘This product is not doing *well.*

An image, perception or concept that is capable of measurement – hence capable of taking on different values – is called a **variable**.

A variable is a property that takes on different values. Putting it redundantly, a variable is something that varies … A variable is a symbol to which numerals or values are attached’

A concept that can be measured on any one of the four types of measurement **scale**, which have varying degrees of precision in measurement, is called a variable

The difference between a concept and a variable

Measurability is the main difference between a **concept** and a variable. Concepts are mental images or perceptions and therefore their meanings vary markedly from individual to individual, whereas variables are measurable, though, of course, with varying degrees of accuracy.

A concept cannot be measured whereas a variable can be subjected to measurement by crude/refined or subjective/objective units of measurement.

Concepts	Variables
• Effectiveness • Satisfaction • Impact • Excellent • High achiever • Self-esteem • Rich • Domestic violence • Extent and pattern of alcohol consumption • etc.	• Gender (male/female) • Attitude • Age (*x* years, *y* months) • Income ($ __ per year) • Weight (__ kg) • Height (__ cm) • Religion (Catholic, protestant, Jew, Muslim) • etc.
• Subjective impression • No uniformity as to its understanding among different people • As such cannot be measured	• Measurable though the degree of precision varies from scale to scale and from variable to variable (e.g. attitude – subjective, income – objective)

Converting concepts into variables

Concepts → Indicators → Variables

Concepts →	Indicators →	Variables	
		Variables	Decision level (working definitions)
Rich	1 Income 2 Assets	1 Income per year 2 Total value of: home(s); boat; car(s); investments	1 if > $100 000 2 if > $250 000
High academic achievement	1 Average marks obtained in examinations 2 Average marks obtained in practical work 3 Aggregate marks 4 etc.	1 Percentage of marks 2 Percentage of marks 3 Percentage of marks	1 if > 75% 2 if > 75% 3 if > 80%
Effectiveness (of a health programme)	1 Number of patients 2 Changes in morbidity (a) Changes in the *extent* of morbidity (b) Changes in the *pattern* of morbidity 3 Changes in mortality (a) Changes in the *Crude Death Rate* (CDR) (b) Changes in the *Age-Specific Death Rate* (ASDR) 4 Changes in nutritional status (a) Changes in *weight* (b) Changes in *illness episodes* (c) Changes in *morbidity*	1 number of patients serviced in a month/year 2 (a) Changes in morbidity rate (number of illness or episodes per 1000 pop.) (b) Changes in morbidity typology 3 1 Changes in CDR 2 Changes in ASDR 4 1 Changes in weight 2 Illness episodes in a year 3 Changes in morbidity type	Whether the difference in before-and-after levels is statistically significant Point-prevalence increase or decrease in each variable as decided by the researcher or other experts

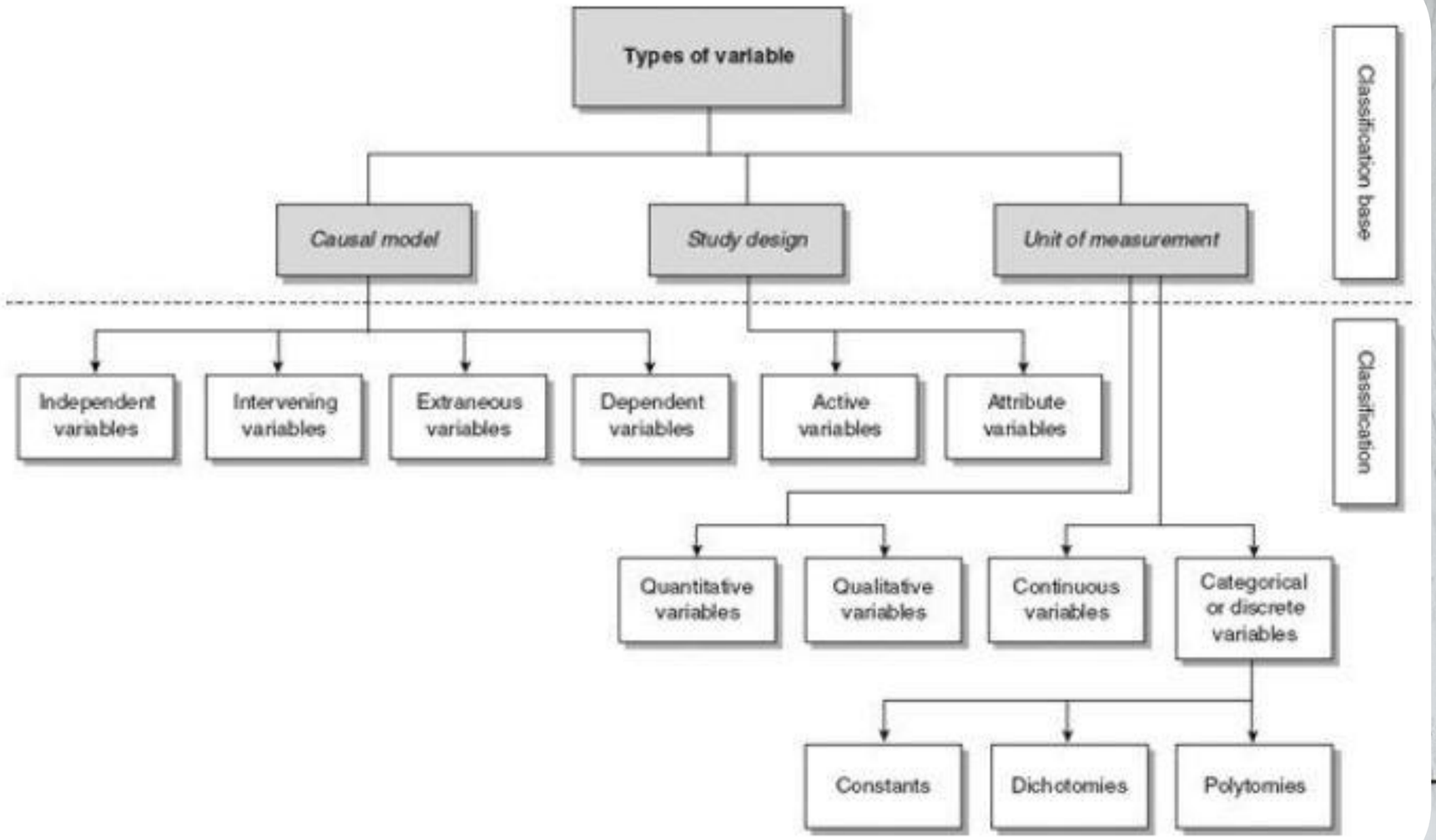
Types of variable

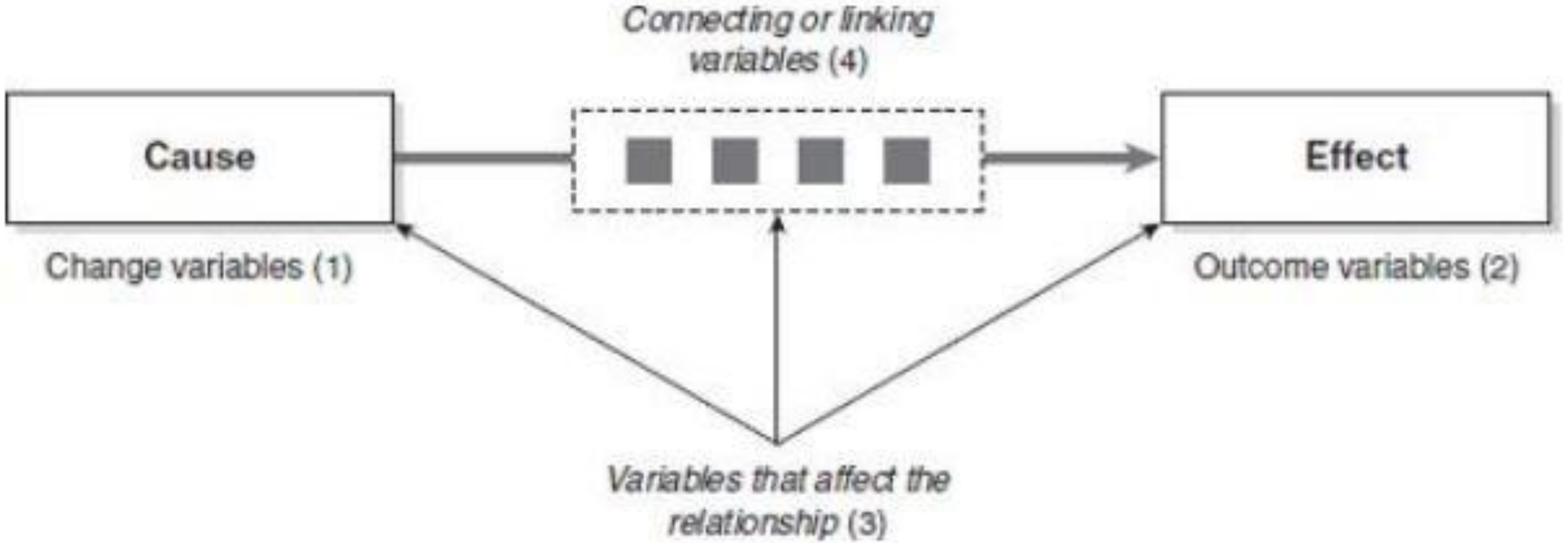
A variable can be classified in a number of ways. The classification developed here results from looking at variables in three different ways:

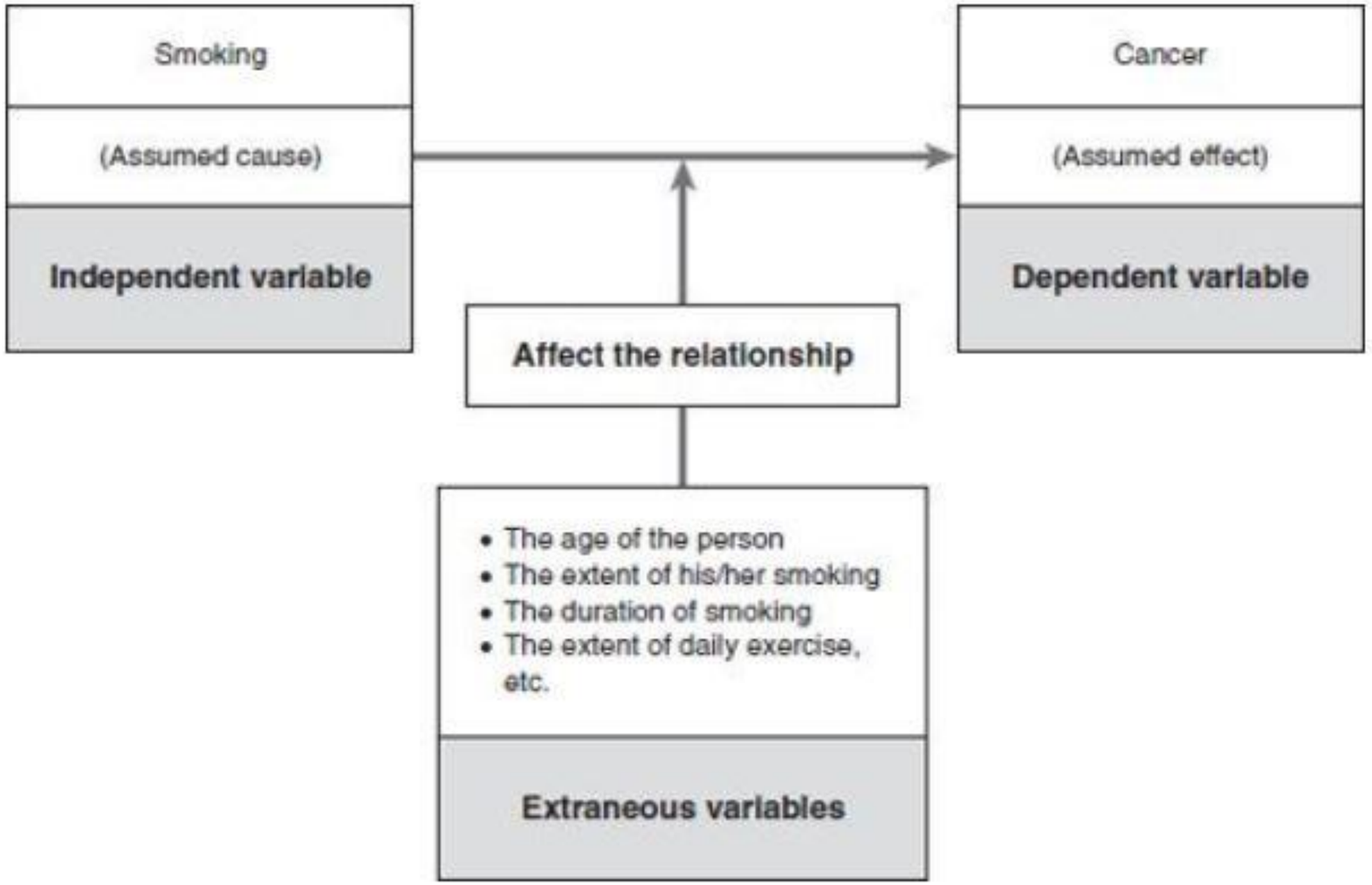
- the causal relationship;
- the study design;
- the unit of measurement.

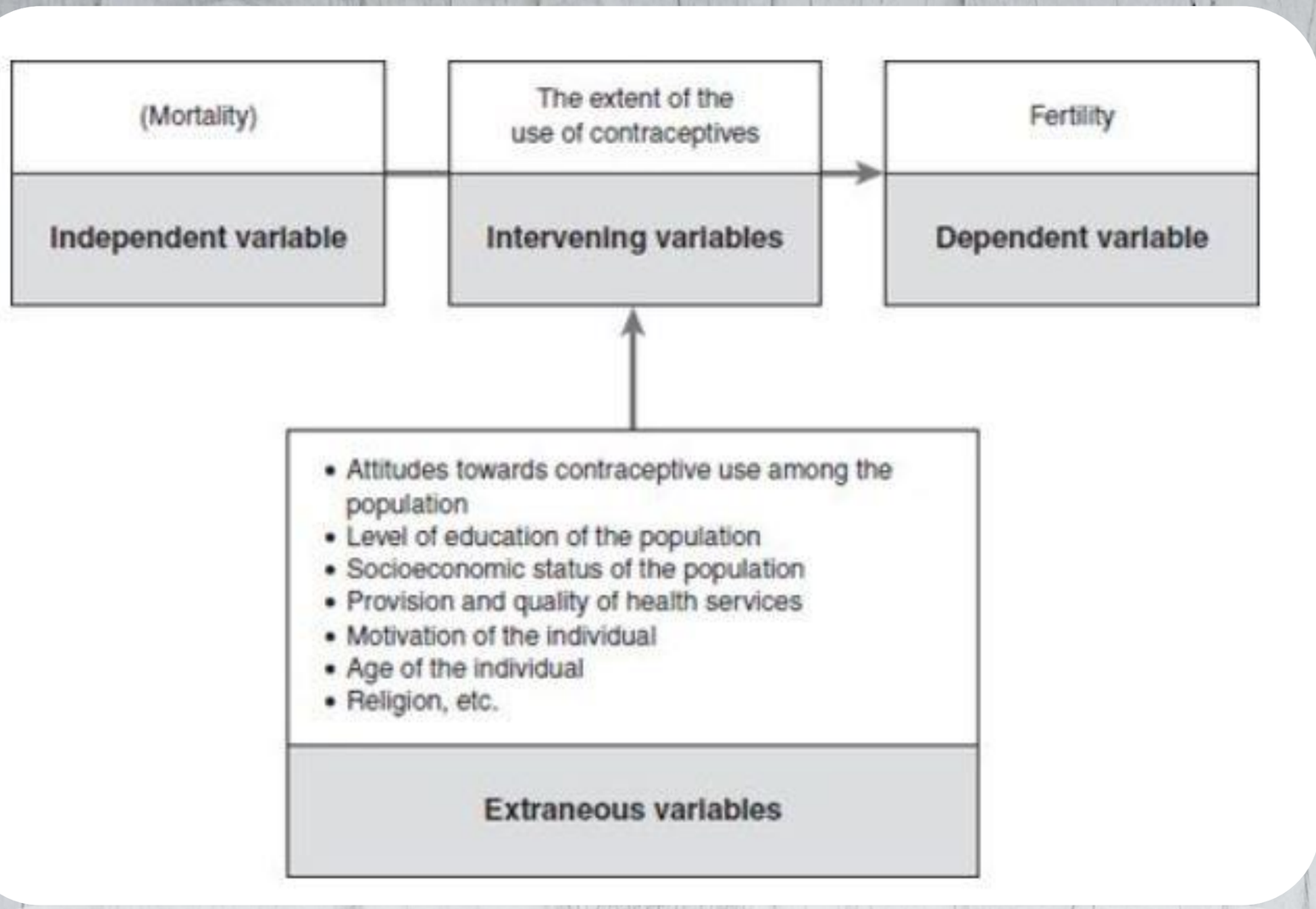
In research terminology, change variables are called **independent variables**, outcome/effect variables are called **dependent variables**, the unmeasured variables affecting the cause-and-effect relationship are called **extraneous variables** and the variables that link a cause-and-effect relationship are called **intervening variables**.

1. Independent variable – the cause supposed to be responsible for bringing about change(s) in a phenomenon or situation.
2. **Dependent variable** – the outcome or change(s) brought about by introduction of an independent variable.
3. **Extraneous variable** – several other factors operating in a real-life situation may affect changes in the dependent variable. These factors, not measured in the study, may increase or decrease the magnitude or strength of the relationship between independent and dependent variables.
4. **Intervening variable** – sometimes called the confounding variable (Grinnell 1988: 203), it links the independent and dependent variables


Types of variable
Classification base
Causal model
Study design
Unit of measurement
Classification
Independent variables
Intervening variables
Extraneous variables
Dependent variables
Active variables
Attribute variables
Quantitative variables
Qualitative variables
Continuous variables
Categorical or discrete variables
Constants
Dichotomies
Polytomies


Connecting or linking variables (4)
Cause
Effect
Change variables (1)
Outcome variables (2)
Variables that affect the relationship (3)


Smoking
(Assumed cause)
Independent variable
Cancer
(Assumed effect)
Dependent variable
Affect the relationship
• The age of the person
• The extent of his/her smoking
• The duration of smoking
• The extent of daily exercise, etc.
Extraneous variables


(Mortality)
The extent of the use of contraceptives
Fertility
Independent variable
Intervening variables
Dependent variable
• Attitudes towards contraceptive use among the population
• Level of education of the population
• Socioeconomic status of the population
• Provision and quality of health services
• Motivation of the individual
• Age of the individual
• Religion, etc.
Extraneous variables

Types of measurement scale

Stevens has classified the different types of measurement scale into four categories:

- nominal or classificatory scale;
- ordinal or ranking scale;
- interval scale;
- ratio scale.

easurement scale	Examples	Characteristics of the scale
Nominal or classificatory	A Tree, house, taxi, etc. B Gender: male/female Attitude: Favourable/unfavourable C Political parties • Labor • Liberal • Democrat • Green Psychiatric disorders • Schizophrenic • Paranoid • Manic-depressive, etc. Religions • Christian • Islam • Hindu, etc.	Each subgroup has a characteristic/ property which is common to all classified within that subgroup
Ordinal or ranking	Income • above average • average • below average Socioeconomic status • upper • middle • low Attitudes • strongly favourable • favourable • uncertain • unfavourable • strongly unfavourable Attitudinal scale (Likert scale – these are numerical categories) • 0–30 • 31–40	It has the characteristics of a nominal scale, e.g. individuals, groups, characteristics classified under a subgroup have a common characteristic PLUS Subgroups have a relationship to one another. They are arranged in ascending or descending order

Interval	Temperature: • Celsius → 0°C • Fahrenheit → 32°F Attitudinal scale (Thurstone scale): • 10–20 • 21–30 • 31–40 • 41–50, etc.	It has all the characteristics of an ordinal scale (which also includes a nominal scale) PLUS It has a unit of measurement with an arbitrary starting and terminating point
	Height: cm Income: $ Age: years/months Weight: kg Attitudinal score: Guttman scale	It has all the properties of an interval scale PLUS It has a fixed starting point, e.g. a zero point

THANK YOU!

Do You Have Any Questions?